Dispatchable demand

Update Paper

6 March 2013

Executive summary

In 2011, the Electricity Authority made the Electricity Industry Participation (Dispatchable Demand) Code Amendment 2011 to introduce a dispatchable demand regime. This Code amendment has not yet come into force. Due to concerns about the cost of the proposal, the Authority has been working with the system operator to identify an alternative option that is cheaper and yet retains many of the benefits of the original design.

Some of the key differences between the designs are that, while the original design allows participation only at non-conforming grid exit points, if approved, the alternative design would allow participation at any grid exit point.

In some other respects, the alternative design has lower 'functionality' than the original design. In particular, the alternative design does not include co-optimisation between dispatchable loads and their interruptible load (IL) reserve offers.

The alternative design would use a pre-dispatch schedule – the non-response schedule – to prepare dispatch notifications once every 30 minutes for participating parties whereas the original design used the system operator's real time dispatch tool to issue instructions every 5 minutes.

The Authority is publishing this paper to inform the industry of the existing work it is undertaking on an alternative design option in an effort to deliver a dispatchable demand product with lower implementation costs.

This paper does not specifically seek feedback. However, should the Authority consider that the alternative design is worth pursuing further, it will need to make further Code amendments and will conduct a formal consultation as part of that Code amending process.

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1. Why is an alternative dispatchable demand design being prepared?

1.1.1 The Electricity Industry Participation (Dispatchable Demand) Code Amendment 2011 (DD Code Amendment) was gazetted on 20 October 2011. That amendment introduces a dispatchable demand regime (Original DD Design) which is due to come into force on 27 June 2013. The Authority has released a consultation paper contemporaneously with this Update Paper which proposes changing the date on which the DD Code Amendment comes into force to 1 May 2014. This is because the system operator has indicated it could not implement the Original DD Design by 27 June 2013.

1.1.2 In September 2012, the system operator provided a more detailed cost estimate for developing its systems to implement the Original DD Design. The cost estimate of $4.8 million was higher than the estimate of $2.5 million available at the time the DD Code Amendment was made. Given this increase in the cost estimate, the system operator suggested that the Authority and the system operator could work together to consider options for simplifying the design of the regime so that the majority of the benefits could still be obtained while reducing system development costs. On 6 November 2012, the Authority's Board agreed to work with the system operator on considering alternative designs.

1.1.3 The Authority and the system operator are concluding the detailed design of an alternative dispatchable demand design (Alternative DD Design). The system operator will then estimate the cost of implementing the Alternative DD Design, and the Authority will estimate the benefits of the design, and the size of the benefits relative to the Original DD Design.

1.1.4 This Update Paper describes the Alternative DD Design. This is not a formal proposal at this stage and the Authority is not specifically consulting on the Alternative DD Design. However, the Authority wishes to make participants aware of the alternative design that is emerging.

1.1.5 The Authority will consult formally on the Alternative DD Design as part of the Code amendment process, should the Authority consider the Alternative DD Design is worth pursuing further.

1.1.6 The following chapters of this Update Paper outline:

(a) the Original DD Design and explain the main influences on the overall cost of implementing that design (Chapter 2)

(b) the Alternative DD Design (Chapter 3)

(c) the anticipated process for progressing this work (Chapter 4).

2. The Original DD Design

2.1 Key features

2.1.1 The key features of the Original DD Design are:

(a) a purchaser at a non-conforming grid exit point (GXP)[1] may apply to the system operator for the right to submit dispatch bids at the GXP for a particular electricity-using device or group of devices, called a dispatch-capable load station (DCLS)

(b) as part of approving an application, the system operator may seek undertakings including the provision of real time indications and measures from the purchaser to the system operator, and maintaining appropriate communication systems with the system operator coordination centre. In general this would mean that the DCLS owner would need to install telemetry metering on the relevant machines that comprise the DCLS

(c) a DCLS must have its own half hour metering

(d) if the system operator has approved a DCLS, the purchaser must submit a separate nominated bid for that DCLS for every trading period

(e) the purchaser may elect to make dispatchable the nominated bid for an approved DCLS by ticking a box on the bid form. The bid is then called a “dispatch bid”, the DCLS is called a “dispatch load station” (DLS), and the purchaser is called a “dispatch purchaser”. This election can be exercised by the purchaser on a half-hour-by-half-hour basis. This aspect of the bid can be revised along with other aspects of the bid as part of the normal bid revision process. A dispatch bid must also specify a maximum ramp up rate and a maximum ramp down rate

(f) dispatch bids will be used as inputs into the price responsive schedule (PRS) and the non-response schedule (NRS). In both cases, both prices and quantities from dispatch bids will be used. Dispatch bids will also be used as an input into real time pricing (RTP) schedules

[1] A non-conforming GXP is a GXP determined by the Authority under the Code as non-conforming, as opposed to conforming. Non-conforming GXPs tend to be those at which it is more difficult for the system operator to accurately predict load. Purchasers at non-conforming GXPs are required to submit nominated bids, whereas a system operator forecast of load is used for scheduling purposes at conforming GXPs.

(g) dispatch bids will be used as an input into real time dispatch (RTD) schedules. The system operator must use the RTD schedule to prepare bid-based dispatch instructions to each dispatch purchaser for each dispatch load station;

(h) a dispatch purchaser must ensure that the DLS acts in compliance with all dispatch instructions

(i) dispatch bids will be used as an input into pricing schedules (including final pricing schedules). Consequently, if a dispatch bid band is marginal in final pricing, it will set the spot price

(j) dispatch purchasers will not receive a separate payment when they are dispatched down. Dispatch purchasers will continue to pay the clearing manager for DLS metered quantities at the final price for that GXP and trading period

(k) dispatch purchasers will be entitled to receive constrained on and/or constrained off payments with respect to their dispatch bids. This compensates the dispatch purchaser when the final price does not justify the average level of dispatch for the DLS

(l) purchasers who purchase electricity for a DCLS must provide half hour metering information to the reconciliation manager each month for each DCLS

(m) if a DLS owner wishes to provide interruptible load (IL), it will be able to submit its IL offer in a new form that can be co-optimised with the associated dispatch bid. This will allow the scheduling software to identify the optimal combination of electricity usage and IL for a DLS.

2.2 Costly aspects of the Original DD Design

2.2.1 In September 2012 the system operator provided a cost estimate of $4.8 million for developing its systems to implement the Original DD Design.

2.2.2 The fact that the Original DD Design makes changes to RTD was identified as one of the major contributors to the estimated cost. In particular, changes made to RTD require the system operator to carry out extensive testing to minimise the chance that system faults or design oversights could jeopardise system security.

2.2.3 A related group of changes that contributes significantly to the overall cost is the need for the system operator to have a robust system for communicating dispatch instructions to the location from which the dispatch load station can be controlled. At present, a system called ‘GENCO’ is used for communicating with generation stations. The same

system or some kind of similarly robust system would be required for dispatch load stations. A robust communication system is required since dispatch compliance is being relied on for system security.

2.2.4 Also there may be significant costs to the system operator that are associated with systems to manage dispatch of dispatch load stations during an outage of normal dispatch systems. The system operator currently uses a system known as ‘stand alone dispatch’ (SAD) when normal dispatch systems are not available. The need to incorporate dispatchable demand fully within SAD creates significant costs.

2.3 Benefits of the Original DD Design

2.3.1 The benefits of the Original DD Design were categorised as follows:

(a) Static benefits

(i) better short term production and consumption decisions by generators and purchasers from better pricing

(ii) more efficient demand-side response to changing conditions within a trading period

(iii) better management of security issues

(iv) better co-ordination between electricity usage and IL provision

(b) Dynamic benefits

(i) better longer term investment decisions from better pricing

(ii) increased competition, especially at peak demand periods, from demand participants competing on an equal footing with generators, which is particularly important in supply shortage situations when there are few options for competition amongst peaking generators.

3. The Alternative DD Design

3.1 Key features

3.1.1 The key features of the Alternative DD Design are presented below in table form, with the features of the Original DD Design in the left hand column for comparative purposes.

	Original DD Design	**Alternative DD Design**
1	A purchaser at a *non-conforming* GXP may apply to have certain machines approved as a DCLS.	A purchaser at *any* GXP may apply to have certain machines approved as a DCLS.
2	DCLSs would be required to have telemetry metering.	Large DCLSs may be required to have telemetry metering but smaller DCLSs may not have to have that metering.
3	A DCLS must have its own half hour metering.	Same as the Original DD Design.
4	The purchaser for a DCLS must submit a nominated bid for the DCLS for every trading period.	Same as the Original DD Design.
5	A DCLS's nominated bid can be either a dispatch bid or a non-dispatch bid. There is a "tick box" on the bid for this purpose. That choice can be made differently for each trading period.	Same as the Original DD Design.
6	Dispatch bids are used as an input into pre-dispatch schedules (PRS and NRS), pricing schedules (RTP, final pricing) and real time dispatch (RTD) schedules. Both the prices and quantities from those bids are used.	Same as the Original DD Design except that dispatch bids are not used as an input into RTD. The inputs into the RTD will not be changed.
7	Whenever a dispatch purchaser "ticks the tick box" on a nominated bid for a DCLS to signal that it is dispatchable, the system operator will issue a bid-based dispatch instruction to the dispatch purchaser for that DCLS. The dispatch instruction will be created from the RTD schedule. A different dispatch instruction may be issued	Same as the Original DD Design except that: (1) the dispatch instruction is created from the NRS and will be issued once near the beginning of the trading period for the whole trading period (there will not be several possibly different instructions issued throughout the trading period); and (2) the system operator will not issue

	Original DD Design	Alternative DD Design
	several times during a trading period as new RTD schedules are run.	dispatch instructions directly to dispatch purchasers, but will send the dispatch information to WITS and WITS will notify the dispatch purchaser.
8	The compliance of a dispatch purchaser with a dispatch instruction will be assessed continually through time since even a short deviation from a dispatch instruction could have security implications. Compliance need not be exact but must be broadly comparable with the standard achieved by generators.	The compliance of a dispatch purchaser with a dispatch instruction will be assessed on average over the trading period. Compliance will need to be sufficiently tight to protect the integrity of final pricing, but there may be a greater “margin of error” allowed than under the Original DD Design because (since RTD inputs are not changing) dispatchable demand is not being relied upon as a security product.
9	A nominated dispatch bid that is marginal in the final pricing schedule will set the spot price.	Same as the Original DD Design.
10	Dispatch purchasers will not receive a specific payment for demand reductions, but they may receive constrained on and constrained off payments when their dispatch profile over the trading period is inconsistent with the final pricing schedule. Ramp rates would be used in the calculation of constrained on/off amounts.	Same as the Original DD Design except that ramp rates will not be used, and DCLS nominated bids will not provide information about ramp rates.
11	Half hour metering information must be provided to the reconciliation manager for each DCLS so that the reconciliation manager can determine their reconciled usage for the purpose of calculating constrained on/off amounts.	Same as the Original DD Design.

	Original DD Design	Alternative DD Design
12	If an electricity user who is a DCLS wishes to have their nominated bid co-optimised with an IL offer for the same machines at the DCLS, this will be possible.	There will be no co-optimisation within the SPD engine between a DCLS's nominated bid and an offer of IL for that DCLS, meaning the participant will have to make its own decision, before the start of the trading period, on how best to use the load of the DCLS.

3.2 Further investigation of IL co-optimisation

3.2.1 While at this stage the basic Alternative DD Design is not intended to include an ability to co-optimise between DCLS demand and IL (refer to row 12 of the table), the Authority is giving that issue further consideration. The Authority has asked the system operator to provide an indication of the costs likely to be incurred to implement co-optimisation, and the Authority intends to investigate the magnitude of the benefits of co-optimisation.

3.3 Comparison of the costs and benefits

3.3.1 The system operator is expected shortly to prepare a cost estimate for implementing the Alternative DD Design. The Authority anticipates that the Alternative DD Design will be substantially cheaper to implement than the Original DD Design.

3.3.2 One key benefit that the Alternative DD Design has over the Original DD Design is that participation is possible at both conforming and non-conforming GXPs, rather than only at non-conforming GXPs.

3.3.3 Apart from that feature, the Alternative DD Design generally has less 'functionality' than the Original DD Design. This will mean that some of the sources of benefits articulated for the Original DD Design will not be able to be regarded as benefits of the Alternative DD Design.

3.3.4 The areas of benefits that may be lost include:

(a) more efficient demand-side response to changing conditions within a trading period;

(b) better management of security issues; and

(c) better co-ordination between electricity usage and IL provision.

4. Anticipated process

4.1.1 The Authority expects to complete work on specifying the details of the Alternative DD Design soon. The system operator will then prepare a cost estimate for implementing that design. The Authority will prepare an analysis of the expected benefits of the Alternative DD Design relative both to (1) no dispatchable demand regime, and (2) the Original DD Design.

4.1.2 The Authority's Board will then make the decision on whether to pursue the Original DD Design or the Alternative DD Design.

4.1.3 If the Authority makes the decision to pursue the Alternative DD Design, a consultation paper will be prepared describing the proposal, setting out the proposed Code amendments necessary for implementing the proposal, and providing an analysis of the costs and benefits of the proposal. After considering submissions, the Authority would then decide whether to make the Code amendments to implement the Alternative DD Design or whether to adopt some other course.

4.1.4 If the Authority makes the decision to pursue the Original DD Design, the Authority and the system operator will prepare detailed business requirements for implementing the regime, and the system operator will prepare a more detailed cost estimate. The Authority would continue to monitor the cost of the project and whether the project will be able to be implemented by the date on which the DD Code Amendment comes into force.

5. Demand response mechanism

5.1.1 Late in 2012 the Australian Energy Market Commission (AEMC) published its "Power of choice" report[2]. Chapter 5 of that report recommended that a demand response mechanism that pays demand resources via the wholesale electricity market be introduced.

5.1.2 This proposal would allow consumers participating in the scheme to reduce consumption and be paid at the wholesale market spot price.

5.1.3 The Authority is interested in furthering demand side participation in the market and intends to review this proposal to see how it, or something similar, could deliver long term benefits to consumers.

[2] see http://www.aemc.gov.au/market-reviews/open/power-of-choice-update-page.html

Glossary of abbreviations and terms

Alternative DD Design	The dispatchable demand regime design currently being developed by the system operator and the Authority, and outlined in the update paper released contemporaneously with this consultation paper
Authority	Electricity Authority
Code	Electricity Industry Participation Code 2010
DCLS	Dispatch-capable load station
DD	Dispatchable demand
DD Code Amendment	Electricity Industry Participation (Dispatchable Demand) Code Amendment 2011
DLS	Dispatch load station: A DCLS that has indicated that it would like its nominated bid to be subject to dispatch
GXP	Grid exit point
IL	Interruptible load: an ancillary service designed to help maintain system frequency in the event of a sudden large generation outage
NRS	Non-response schedule
Original DD Design	The dispatchable demand regime design contained in the DD Code Amendment
PRS	Price response schedule
RTD	Real time dispatch (schedule)
RTP	Real time pricing (schedule)
SAD	Stand alone dispatch
WITS	Wholesale information and trading system