Submission to the

The Energy Value of Distributed Generation

Distributed Generation Inquiry Stage 1 Draft Report

Melbourne Energy Institute

June 2016

Introduction

The Melbourne Energy Institute (Institute) welcomes the opportunity to provide comment on *The Energy Value of Distributed Generation Distributed Generation Inquiry Stage 1 Draft Report.*

The Institute brings together the work of over 150 researchers, across seven faculties at The University of Melbourne , providing international leadership in energy research and delivering solutions to meet our future energy needs. By bringing together discipline-based research strengths and by engaging with stakeholders outside the University, the Institute offers the critical capacity to rethink the way we generate, deliver and use energy.

The Institute presents research opportunities in bioenergy, solar, wind, geothermal, nuclear, fuel cells and carbon capture and storage. It also engages in energy efficiency for urban planning, architecture, transport and distributed systems, and reliable energy transmission. Economic and policy questions constitute a significant plank of the Institutes research program and include: market regulation and demand; carbon trading; energy system modelling; climate change feed backs; and social justice implications of energy policy.

This submission addresses four main areas raised for consultation in the proposed approach paper. Summary points can be found on below. We thank you for the opportunity to provide comment to this process and please do not hesitate to contact us at the Melbourne Energy Institute on 03 8344 3519.

Summary

- Wholesale spot prices *do not* reflect retailers costs, due to contracting and hedging arrangements (particularly one year in advance).
- Futures markets provide a transparent two part price signal, that meets the criteria established by the Commission.
- The 'critical peak' tarriff (limiting payments to $300 per MWh) misses an important component of cap contract arrangements.
- The output from solar generators is underestimated in the current approach
- Input assumptions for emissions reductions modelling need to be clearly established.

Contents

1 Energy Value in the wholesale market

1.1 Contracting in the wholesale market

The Commission argues that the wholesale spot market price is relevant reference point for valuing distributed generation exports. This is justified on the basis that *'they no longer need to purchase that energy from the wholesale market'* and that the wholesale spot price is *'the price they would have paid for that energy in the wholesale market'*[1]. This approach ignores the prevalence and role of contracting, hedging and other risk management strategies employed by participants in the National Electricity Market (NEM).

The Australian NEM is known for being a volatile market. Spot prices volatility creates risks for generators and retailers alike, which is typically managed with contracts or other hedging strategies. Common contract structures are bilateral hedges (Over-The-Counter, OTC) and Exchange Traded Futures (ETF). In the 2014-2015 financial year, 84% of hedging contracts were traded through ASX (ETF) and 16% were traded through bilaterally (OTC)[2].

Exchange Trade Futures allow a generator or retailer to manage spot price volatility in a similar manner to an OTC swap (for example, a Power Purchase Agreement). Currently, three types hedging contracts are commonly traded (see the AEMC report[3] and Productivity Commisions report[4] for further details and discussion):

- **Base load futures**, which cover a full 24 hour period on each day over a specified calendar quarter.
- **Peak load futures** which only cover the period from 7:00am to 10:00pm on working weekdays in a quarter.
- **$300 cap futures**: Allow a retailer to manage the risk of high spot prices in a similar manner to an OTC cap with a strike price of $300/MWh.

Figure 2 illustrates how a retailer might manage the risk associated with their customer load using a variety of these products. The lines represent a hypothetical load profile, and the shaded areas represent the coverage provided by different hedging products.

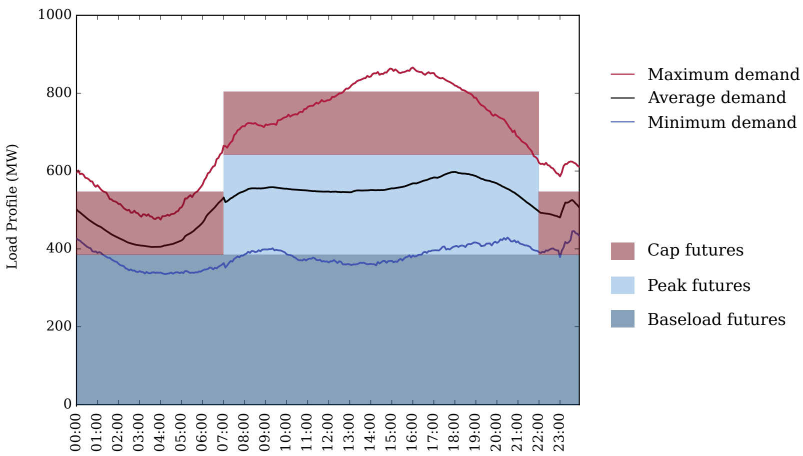

Figure 1: Illustrative risk manage ment approach, [adapted from PC [4]]

[1] ESC, *The Energy Value of Distributed Generation, Distributed Generation Inquiry Stage 1 Draft Report*, page 39.

[2] AER, *State of the energy market 2015*.

[3] AEMC, *NEM financial market resilience: Issues Paper*; Productivity Commission, *Electricity Network Regulatory Frameworks*.

[4] Productivity Commission, *Electricity Network Regulatory Frameworks*, Appendix C.

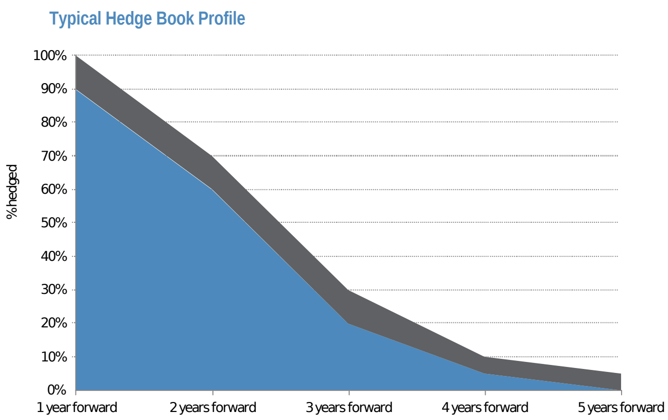

Figure 2: Typical forward contract position, [J.P. Morgan estimates, Company data]

By using these hedging strategies, a retailers and generators exposure to the spot market price is limited[5]. Figure 2 sets out a typical forward contract position of a retailer, which mirrors that of the generator[6]. Similarly, as described in *'Forward contracts in electricity markets: The Australian experience'*[7]:

> *'... at one year out, [retailers] may want to be fully contracted (100% of final contract cover in volume), two years out 60–70% contracted, three years out 20–30% contracted, and at four years out 5–10% contracted.'*

Given the high level of contracting, particular one year out, we submit that the futures prices are a superior benchmark for developing price structures. We argue that this meets the criteria developed by the Commission, albeit with increase transparency and consistency.

- **Market Reflectiveness**: Given the level of contracting, the futures market better reflects the actual costs faced by retailers. Exports reduce the amount of electricity that a retailer needs to procure contract cover for.
- **Simplicity of implementation**: The peak and off peak times are functionally very similar to the two part tariff identified by the Commission (which rated equal highest, excluding the flat tariff option). From a retailers perspective, this should be even more straightforward to implement, as the peak times (7pm – 10pm) align with established 'standard' times for hedging wholesale market exposure.
- **Likelihood to stimulate an efficient behaviour response**: Similar to above, the peak and off peak times are expected to result in equivalent behaviour responses to the two part tariff identified by the Commission.

This approach offers two additional benefits. Firstly, increase transparency, predictability and simplicity: futures prices are publicly available and traded through the ASX. As such, the method of determining year ahead tariff prices does not rely on opaque modelling that forecast prices (i.e. the ACIL Allen PowerMark model), and can be estimated by consumers, retailers or third parties with relative confidence in advance.

Secondly this allows for an approach that is consistent across all tariff proposals. Currently, the Commission is proposing a forecast approach for the peak, off-peak (and shoulder) periods, but a hedging approach for the 'critical peak' tariff. Using the futures market will allow a consistent approach across all tariffs.

[5]This is particularly the case for vertically integrated utilities, which dominate the NEM
[6]Steed and Laybutt, *Merchant Utilities: Who gets the Missing Money?*
[7]Anderson, Hu, and Winchester, "Forward contracts in electricity markets".

1.2 Critical peak and cap contracts

As identified by the Commission, retailers and generators would ordinarily enter into contracts to mitigate their risk when the wholesale electricity price exceeds $300 per MWh[8]. While this limits exposure to $300 per MWh, the retailers have to pay for this privilege. The product is analogous to insurance, where the excess is the $300 per MWh and the premium is cap contract payment. The AEMC describes cap contracts as follows[9] (our emphasis added):

> *The parties agree on a strike price for the cap. If the spot price exceeds this strike price, the seller of the cap (usually a generator) must pay the difference to the buyer of the cap (usually a retailer). A common strike price for a cap contract is $300/MWh.* ***In return, the buyer of the cap will pay the seller a fee, which provides the generator with an extra source of revenue.*** *Buying such a cap helps protect the retailer from high spot prices.*

AEMC, 2012

This both provides a more secure revenue for generators and a hedge against extreme price spikes for retailers. Figures 3 and 4 provide an illustration of how cap contracts operate, and the financial transfers that occur. The proposal, as described in the draft report misses this part of the transaction.

At the moment, the price of Q1 2017 cap contracts for Victoria are approximately $10/MWh[10]. These payments are made to the generator for all trading intervals of the year (even if the generator is not generating). While a generator revenue rate of 30c per kWh would be payable in those half hours when the wholesale electricity price exceeds $300 per MWh, a generator would also be eligible for $87.60 per kW per year, for providing that capacity. This part of the cap contract is currently not reflected in the Commission draft report.

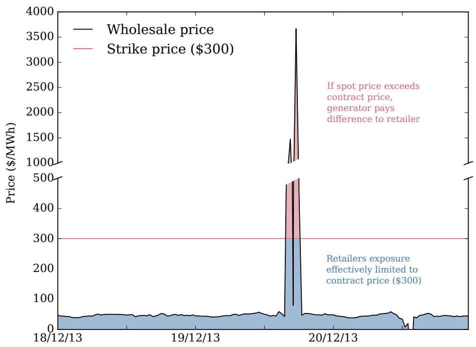

Figure 3: Illustrative cap contract

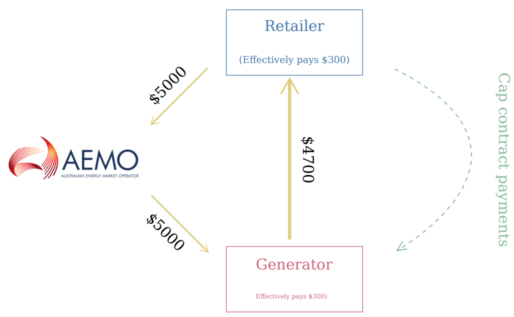

Figure 4: Illustrative transfers, at wholesale spot price of $5000

[8]ESC, *The Energy Value of Distributed Generation, Distributed Generation Inquiry Stage 1 Draft Report*, page 51.
[9]AEMC, *NEM financial market resilience: Issues Paper*, table 2.1, page 10.
[10]AER, *Electricity report 8 - 14 May 2016.pdf*.

1.3 Forecasting

The Commission makes note of the availability of price forecasts[11]:

> *AEMO publishes on their website forecasts wholesale electricity prices for each half hour interval for the following day. These forecasts known as pre-dispatch data could be used by distributed generators to predict when critical peak periods are likely to occur*

Whilst this pre-dispatch data is available, it should be noted that it is *not* particularly accurate at forecasting 'critical peak periods' (as defined by the Commission as >$300 per MWh. Analysis of the 46 periods between 2013 and 2015, (as identified on page 51 of the report, table 4.3) illustrates that the majority of these events are not accurately forecast. Figure 5 below illustrates the forecast accuracy for these events. Approximately 60% of the time, the forecast are incorrect by more than $5000 per MWh (even half an hour ahead of time).

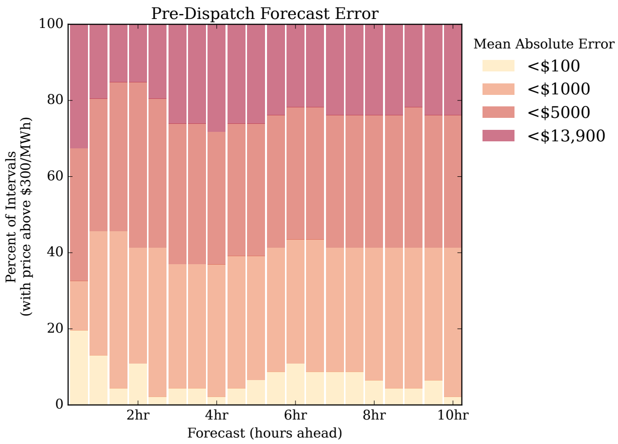

Figure 5: Predispatch forecast error for prices above $300

[11] ESC, *The Energy Value of Distributed Generation, Distributed Generation Inquiry Stage 1 Draft Report*, page 57.

2 Environmental and Social benefits

2.1 Modeling emissions reductions

Solar output

The Commission has adopted the Clean Energy Regulators approach for estimating solar output in the draft report. Whilst this is *'is an Australian-wide and industry accepted method'*[12], it is both out dated and designed for a different purpose than estimating emissions reduction. The volume of certificates created under the Small-Scale Renewable Scheme (SRES) is not actually reflective of annual electricity production and as should not be used as such. Our previous submission has further detail on this point.

Estimating the rate of abatement

The Commission proposes to use a modelling approach to determine the emissions reductions, relative to a counter factual scenario. Like all modelling, input assumptions are critical. In this case, a critical assumption is what the generation mix would be in a counter factual scenario.

Since 2011, almost 5000 MW of capacity have been withdrawn from the market[13] (see table 1). In the counterfactual scenario, some of the withdrawals my not have occurred, which should be considered in any modelling exercise.

FY	Station	State	Capacity
2011-12	Northern	SA	540
2011-12	Playford B	SA	200
2011-12	Swanbank B	QLD	480
2012-13	Morwell Brix	Vic	95
2012-13	Munmorah	NSW	600
2012-13	Tarong	QLD	700
2012-13	Collinsville	QLD	180
2014-15	Wallerawang C	NSW	1000
2014-15	Redbank	NSW	144
2014-15	Pelican Point	SA	249
2014-15	Swanbank E	Qld	385
2015-16	Anglesea	Vic	150
Total			**4723**

Table 1: Withdrawals since 2011-12

2.2 Federal Climate Policy

Climate policy has been plagued by uncertainty over recent years. However, an opportunity for bipartisan approach is emerging from the current Federal election.

While there is considerable uncertainty in this area, consideration could be given for allowing payments for to be made on an emissions intensity basis (or at least not be ruled out), rather than the emissions volume approach as presented by the Commission. The AEMC prepared a report for submission to the Governments 'Safegaurd Mechanism' consultation, which also forms the basis for the oppositions policy for the electricity sector[14].

[12] ESC, *The Energy Value of Distributed Generation, Distributed Generation Inquiry Stage 1 Draft Report*, page 91.
[13] AER, *State of the energy market 2015*.
[14] AEMC, *Submission to the Emissions Reduction Fund Safeguard Mechanism*.

References

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