Reach SOLAR ENERGY

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Australian Energy Market Commission
PO Box A2449
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NSW 1235

For the Attention of Ms Therese Grace (therese.grace@aemc.gov.au)

Reference code EPR0052

1 May 2018

Dear Ms Grace,

DISCUSSION PAPER – CO-ORDINATION OF GENERATION AND TRANSMISSION INVESTMENT

Reach Solar energy ("**Reach**") is very pleased to provide its response to the findings described in the discussion paper prepared by the Australian Energy Market Commission (AEMC) titled "Co-ordination of generation and transmission investment" dated 13 April 2018.

By way of background, the intent of Reach is to develop 1200MWac of large-scale solar photovoltaic (PV) by 2020/21. The driver for this new-build is the existing Renewable Energy Act legislation and a Reach target of structuring solar PV projects such that they can compete with wind, gas and black coal-fired generation without a government grant.

Reach management (see www.reachsolarenergy.com.au) have a proven track record with operations, development and raising large-scale capital for both energy and infrastructure projects in South Australia, other States in Australia and internationally.

Summary

In summary, Reach considers the following:

1. In its experience, only 10 GW to 15GW of the 45GW mentioned in the paper new generation is likely to secure funding and contract support. Reach considers supply - demand will be met by growth in other areas including demand-side/ efficiency management, micro-grid developments, and customer-led generation and energy storage technology;

2. The AEMC paper correctly interprets the dilemma for "funded augmentation". There is no commercial case for a generator to fund an upgrade to transmission which is then potentially fully utilized by other third parties. To date the open access regime has worked for grid-connected generation. If additional costs were introduced for transmission (i.e. use of system charges) then it is likely that these would be internalised in the electricity tariff and hence ultimately paid for end-use customers.

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3. Reach agrees the TNSPs are unlikely to relieve congestion unless it is required to do so. Reach consider an "optional firm access" mechanism may facilitate this and suggests this is considered in the future.

   Regarding the best locations to develop large-scale renewable generation, the technology is developing for both wind and solar PV and site location is not just driven by wind regime and/ or solar irradiance. It is a complex array of factors including community acceptance, grid connection and what infrastructure is in place for logistics management.

   Reach therefore favours Option 1 in the near-term with a review at the end of 2020. Option 2 is flawed for reasons explained below, and then Option 4 is the favoured approach for designated renewable zones in the medium to long-term. To facilitate Option 4 the "optional firm access" proposal may warrant further investigation in the future when there is less coincident regulation ongoing;

4. Reach does not support nodal pricing due its complexity and consider transmission constraints can be mitigated using other signals;

5. Reach does not favour a "clustering" or generators working together approach for the management of transmission connections. This is unworkable due to competitive tensions and as business opportunities do not follow a prescribed path and/ or time and project transactions have a finite validity (i.e. demand for energy, debt and foreign exchange terms); and

6. Reach considers Transmission Use of System charges ('TUOS') should not be paid by hybrid generators (renewable and energy storage behind the meter) if the main focus is generation and a provider of ancillary services i.e. it should be treated similar to the use of water as an energy storage medium. Nor should there be separate registration for renewable generation (semi-scheduled) and energy storage for this configuration. However, where a generator intends to behave as a demand and imports energy from the grid for arbitrage purposes, it should pay TUOS charges.

Reach will respond under separate covering letter to the AER review (Issues paper dated February 2018) in respect of the AEMO ISP.

I hope this is of interest to AEMC and please do not hesitate to contact me if you have any questions on the same (0447 350 442 or julian@reachsolarenergy.com.au).

Yours sincerely,

Mr. Julian Dichiera

Enclosure: detailed response to AEMC discussion paper

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Detailed response to the points raised in the AEMC paper dated 13 April 2018

DISCUSSION PAPER – CO-ORDINATION OF GENERATION AND TRANSMISSION INVESTMENT

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A. Congestion

The existing transmission system for the National Electricity Market (90% of electricity demand), is located where large coal reserves and hydro-electric resources are located. A number of these locations are not suitable for new generation using renewables. Site selection for new generation carefully reviews the grid connection; the cost to connect, likelihood of congestion and a forecast of marginal loss factor.

Multiple studies have confirmed to date congestion has not been an issue. This matter has also been helped by a decline/ flattened NEM demand since 2008/09.

The new-entrant generation is wind and solar PV. Investors will consider acquiring existing coal-fired power plant[1] but Reach continues to consider most investors (equity and debt including the World Bank) are not prepared to invest in any form[2] of new-build coal-fired power plants (in Australia and worldwide), and the fuel remains firmly linked to cyclical global thermal coal pricing.

Gas generation is proven, and greenhouse gas emissions are one third of black coal generation, but fuel supply is complicated by cyclical gas prices (now linked with LNG export), expensive hot gas path components, and complex gas transport arrangements.

Nuclear is not considered to be politically/ socially acceptable in Australia (nor in most OECD countries).

Despite the lack of a bi-partisan policy for greenhouse emissions, most business and investors have an outlook which includes a value on such emissions and an expectation that this will be internalised in the electricity tariff.

Although the discussion paper mentions "45,000MW" of new generation Reach management considers 10GW to 15GW of the 45GW mentioned are likely to be implemented because they have not secured consents/ clearances, and/ or contract arrangements and / or funding or the energy will simply not be needed.

Other initiatives are also likely to grow including demand-side management, micro-grids, customer based energy storage and distributed generation which will in turn reduce the reliance on grid-connected generation.

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[1] For example, the recent divestment of 1000MW Loy Yang B power station by Engie and Mitsui & Co and purchase by Alinta energy

[2] Including high efficiency coal-fired generation due to lack of investor and debt appetite, and a contingent liability on greenhouse gas emissions.

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B. Connection

There is a proven process to connect generation to the grid system. A detailed generator performance standard articulates the technical criteria required to connect the new generator into the grid and includes comprehensive modelling under a number of scenarios. Reach consider this should continue.

Reach does not support a "clustering" approach to manage transmission connections because business opportunities do not arise in such a prescribed manner and transactions have a finite validity (demand for energy, funding, foreign exchange etc).

New legislation comes into force from 1 July 2018 which should provide more competition within TNSP networks to connect. This is turn should enable a reduced electricity tariff to be offered to retailers.

Reach continues to advocate a market-based mechanism and one which is technology agnostic.

The location and technology used for renewables is uncertain including wind, solar PV, biomass and hydro-electric. However, this uncertainty is also true for the continued operation of existing thermal power plants (e.g. coal and gas). If they are displaced and/ or retire then the transmission infrastructure that connected them is likely to continue to feature in the end-customer network charges.

The above uncertainty also exists for distributed generation schemes.

The AEMC paper suggests[3] generator contracting is moderated due to concerns regarding transmission congestion but Reach suggests this is more due to plant non-availability and the consequences of firm financial contracts (i.e. if wholesale prices go to $14,800/MWh).

Other matters

Marginal loss factors – continues to be generator project risk. Mitigate with upfront scenario analysis and site selection.

Inter-regional price differences – contract generation on same node as asset is located and/ or use contracts to hedge inter-regional risk.

C. New types of generation

Renewables has a low but not zero short-run marginal cost. Wind incurs O&M cost during operation and both technologies require mandatory expenditure for costs such comprehensive insurance arrangements.

[3] Comment on page 19

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Hybrid arrangements with renewable and (some) energy storage are likely to feature more in the future as costs reduce.

Reach continues to consider the ongoing trials at Hornsdale 3 (windfarm) will reaffirm fast-acting inverter technology (used by wind and solar PV) can:

(a) operate responsively to automatic generator control by AEMO and provide certain frequency regulation services; and

(b) dampen the rate of change of frequency under severe network disturbances which in turn is expected to reduce the amount of system inertia required to maintain the frequency within acceptable limits.

The same trials will also demonstrate that energy storage can alleviate congestion and provide "raise" services provided there is a reward for such action in the NEM.

Reach considers:

i. Energy storage systems (ESS) which are located on the project site but feed into the wind/ solar PV inverters i.e. behind the meter connection. This effectively smooths the output from the generator an enables enhanced ancillary services. This arrangement should not pay Transmission Use of System charges (TUOS) i.e. principle action is as a generator and a provider of ancillary services, and therefore should be treated similar to the use of water as an energy storage medium;

ii. An ESS which is connected directly to the grid system e.g. say to capture arbitrage in the market, should however pay TUOS when charging and no TUOS when generating (metered load or generation provides the "matter of fact" calculation); and

iii. In view of item (a) above, its makes no sense to treat hybrid arrangements (renewable and energy storage) in the form of a semi-scheduled generator (renewable generator), and scheduled generating unit and scheduled load (energy storage). Generator arrangements should prevail for option (i).

If TUOS is payable with the above arrangements, then the question remains who pays. Reach consider the cost of TUOS will ultimately be internalized in the electricity tariff and factored into the decision by the generator to participate in energy arbitrage, and therefore the end-consumer will ultimately pay.

D. Concept of renewable zones

Reach notes the concept of renewable zones was broached as part of the Finkel Review and AEMO has commenced the development of the Integrated System Plan.

The existing grid system was essentially clustered around transmitting electricity from the coal mines and hydro-electric schemes to customers.

As the CEFC mentioned[4] large renewable generation projects are clustered around existing grid system. Reach consider this is a correct approach and serves to integrate renewable by using as much of the available grid resource as possible.

End-use customers will need to fund this infrastructure. It is no different to existing coal and gas-fired power plant being retired and/ or displaced by other forms of generation including sources from distributed networks. The grid which connects these power plant today would effectively be under-utilised unless the transmission system supplied generation from other sources.

Reach agrees with an outlook where demand-side response is more accepted by customers but that overall electricity demand increases with population growth, increasing use of electrical appliances and anticipated increase in electric vehicles.

The AEMC paper correctly interprets the dilemma for "funded augmentation". There is no commercial case for a generator to fund an upgrade to transmission which is then potentially fully utilized by other third parties.

Reach therefore favours Option 1 in the near-term with a review at the end of 2020. Option 2 is flawed for reasons explained below, and Option 4 is the favoured approach for designated renewable zones in the medium-term. The "optional firm access" proposal may warrant further investigation in the future when there is less coincident regulation ongoing and be designed in a way that reduces the risk of stranding.

To date the open access regime has worked for grid-connected generation. If additional costs were introduced for transmission (i.e. use of system charges) then it is likely that these would need to be internalized in the electricity tariff and hence ultimately paid for end-use customers.

Connection of new generation can also alleviate short-supply (and wholesale price volatility) which benefits end-consumers with a reduced tariff.

Reach considers the existing grid system still has opportunities for connection which can be utilised.

Reach does not support nodal pricing due its complexity and consider transmission constraints can be mitigated using other signals.

In the near-term, Reach favours the open access arrangements continuing over the other options mentioned by the AEMC. The "optional firm access" proposal may warrant further investigation in the future when there is less regulation ongoing.

The example provided by AEMC[5] mentioned the geothermal developments some 10 years ago. The reality was the technology was experimental and unproven. This is not the case for wind and/or solar PV technology.

The AEMC ruling in late 2017 decided to assign responsibility to TNSP for system strength. Reach continues to agree with this decision and remind the AEMC that the optimum solution is a market-based solution that may not be local to the new generation project site i.e. it could be hundreds of

[4] Page 53 comment

[5] Reference to the Australian Geothermal Energy Association report on page 63

kilometres away and local to demand. Enforcing grid solutions local to generation sites could ultimately cause more cost to end-consumers.

Best locations to develop large-scale renewable generation. The technology is developing for both wind and solar PV. Locations are not just driven by wind regime and solar irradiance. It is a complex array of factors including community acceptance, grid connection and logistics management.