2016-04-01

Tom Hallam
Manager Regulation and Network Strategy
Asset Management Division
AusNet Services
Locked Bag 14051
MELBOURNE CITY
VIC 8001

Level 22
530 Collins Street
Melbourne VIC 3000

Postal Address:
GPO Box 2008
Melbourne VIC 3001

T 1300 858724
F 03 9609 8080

Dear Tom

Re: Asset Renewal for Synchronous Condensers at Brooklyn and Templestowe Terminal Stations

We refer to your correspondence of 29 July 2015.

AEMO has now completed the quantitative studies to determine the market benefit of the Brooklyn and Templestowe Synchronous Condensers (SCOs), taking into account future market conditions and optionality benefit and can confirm that the retirement of the SCOs should not adversely impact the market.

AEMO evaluated the benefit of either replacement or refurbishment together with alternatives to the SCOs under the scenarios developed in the 2015 National Transmission Network Development Plan (NTNDP) as well as an additional sensitivity with increased wind generation in Victoria.

The study concluded that the SCOs are not required to maintain system security and the cost of refurbishment outweighs any market benefit. The SCOs do provide some market benefit in the sensitivity with surplus generation in Victoria, however similar net market benefits can be obtained by replacing both SCOs when required. There is therefore limited value in retaining these existing SCOs on the chance that this scenario eventuates. Please see attachment A for further details on the scenarios, options and study results.

AEMO will continue to monitor any emerging limitations under both its Victorian and National planning functions. It is expected that any new SCO or alternative augmentations to provide a similar service will be identified in AEMO's planning publications such as the NTNDP or the Victorian Annual Planning Review (VAPR).

[redacted]

Should you have any questions in relations to this letter, please contact Laura Walsh on (02) 8884 5618 or Laura.Walsh@aemo.com.au.

Australian Energy Market Operator Ltd ABN 94 072 010 327 www.aemo.com.au info@aemo.com.au

NEW SOUTH WALES QUEENSLAND SOUTH AUSTRALIA VICTORIA AUSTRALIAN CAPITAL TERRITORY TASMANIA

Yours sincerely

Nicola Falcon
Group Manager Planning

APPENDIX A — Scenarios and Results

The following scenarios were considered in this investigation:

2015 NTNDP Gradual Evolution (GE): This scenario assumes operational consumption continues to increase in line with the 2015 National Electricity Forecasting Report (NEFR) medium scenario, and there is a gradual penetration of residential electricity storage to 8 Gigawatt hours (GWh) installed by 2035 as forecast in AEMO's 2015 Emerging Technologies Information Paper.

2015 NTNDP Rapid Transformation (RT): This scenario assumes that operational consumption follows the 2015 NEFR low scenario, and is lowered further by greater rooftop PV uptake (33.3 GW installed capacity by 2034-35, compared to 20.9 GW in the Gradual Evolution scenario) and a 40% penetration of residential battery storage (19.1 GWh installed capacity) by 2035. The Rapid Transformation also modelled Hazelwood shutting down incrementally between 2018/19 to 2020/21 due to lower demand and new renewable generation.

2015 Gradual Evolution + 500MW additional wind in Victoria (GE+): This test scenario is a modification of the Gradual Evolution scenario, moving 500MW of new wind from New South Wales to Victoria. This reflects the high interest in potential wind farms in Victoria, based on the connection enquiries.

Table 1 shows results with market benefits weighted across the three scenarios based on a weighting of 70%, 25% and 5%[1] for scenario GE, RT and GE+ respectively. The final three tables show results for the individual scenarios.

Table 1—Weighted market benefits across three scenarios

Description	Gross Market Benefits ($M)		Total Gross Market Benefit($M)	Total Costs ($M)	Net Benefits[2] ($M)	Rank
	Transient stability	Avoided Line switch				
Refurbish BLTS	$2.8	$2.3	$5.1	$12.4	-$7.3	4
Refurbish TSTS	$4.2	$0.0	$4.2	$16.0	-$11.8	6
Refurbish Both	$8.9	$2.3	$11.2	$25.1	-$13.9	7
One new SCO	$4.0	$3.5	$7.5	$16.0	-$8.5	5
Two new SCO	$8.8	$3.5	$12.3	$28.7	-$16.4	8
Reactor	$0.0	$3.5	$3.5	$9.6	-$6.1	3
Retire All SCOs	$0.0	$0.0	$0.0	$3.3	-$3.3	1
Retire BLTS in 2018-19	$1.1	$0.4	$1.5	$5.0	-$3.6	2

Table 2—Market benefits (Gradual Evolution scenario)

Description	Gross Market Benefits ($M)		Total Gross Market Benefit($M)	Total Costs ($M)	Net Benefits[1] ($M)	Rank
	Transient stability	Avoided Line switch				
Refurbish BLTS	$2.3	$2.9	$5.3	$12.4	-$7.1	4
Refurbish TSTS	$3.8	$0.0	$3.8	$16.0	-$12.2	6
Refurbish Both	$8.4	$2.9	$11.4	$25.1	-$13.7	7
One new SCO	$3.4	$4.5	$8.0	$16.0	-$8.0	5
Two new SCO	$8.2	$4.5	$12.8	$28.7	-$16.0	8
Reactor	$0.0	$4.5	$4.5	$9.6	-$5.1	3

[1] Analysis indicates the next 2-3 years is the most critical period in determining the option ranking. Therefore the Gradual Evolution Scenario is given a more significant weighting.

[2] Note that net market benefits are negative in all scenarios because of the large retirement cost. Even options for refurbishment will eventually incur these costs at the end of the extended asset life.

Retire All SCOs	$0.0	$0.0	$0.0	$3.3	-$3.3	1
Retire BLTS in 2018-19	$0.5	$0.4	$1.0	$5.0	-$4.1	2

Table 3—Market benefits (Rapid Transformation scenario)

Description	Gross Market Benefits($M)		Total Gross Market Benefit($M)	Total Costs ($M)	Net Benefits[1] ($M)	Rank
	Transient stability	Avoided Line switch				
Refurbish BLTS	$3.5	$0.3	$3.8	$12.4	-$8.6	3
Refurbish TSTS	$4.5	$0.0	$4.5	$16.0	-$11.5	6
Refurbish Both	$8.2	$0.3	$8.5	$25.1	-$16.6	7
One new SCO	$4.8	$0.4	$5.2	$16.0	-$10.8	5
Two new SCO	$7.9	$0.4	$8.3	$28.7	-$20.4	8
Reactor	$0.0	$0.4	$0.4	$9.6	-$9.2	4
Retire All SCOs	$0.0	$0.0	$0.0	$3.3	-$3.3	2
Retire BLTS in 2018-19	$2.8	$0.2	$3.0	$5.0	-$2.1	1

Table 4—Market benefits (Gradual Evolution +500MW wind in VIC from NSW scenario)

Description	Gross Market Benefits($M)		Total Gross Market Benefit($M)	Total Costs ($M)	Net Benefits[1] ($M)	Rank
	Transient stability	Avoided Line switch				
Refurbish BLTS	$5.8	$2.9	$8.8	$12.4	-$3.6	5
Refurbish TSTS	$8.5	$0.0	$8.5	$16.0	-$7.5	8
Refurbish Both	$19.5	$2.9	$22.5	$25.1	-$2.6	1
One new SCO	$8.5	$4.5	$13.1	$16.0	-$2.9	3
Two new SCO	$21.5	$4.5	$26.1	$28.7	-$2.7	2
Reactor	$0.0	$4.5	$4.5	$9.6	-$5.1	7
Retire All SCOs	$0.0	$0.0	$0.0	$3.3	-$3.3	4
Retire BLTS in 2018-19	$0.6	$0.4	$1.0	$5.0	-$4.0	6