SA Power Networks

Supporting document 5.35

Low Voltage & Quality of Supply Remediation Capital Expenditure (augex) Forecast

2020-25 Revised Regulatory Proposal

10 December 2019

Low Voltage & Quality of Supply Remediation Capital Expenditure (augex) Forecast

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QoS BAU capital expenditure (augex) forecast

This submission recommends the continuation of funding for capital expenditure (**capex**) category augmentation expenditure (**augex**) related to the business as usual (**BAU**) function of Quality of Supply (**QoS**), at a total revised cost of $46.1 million over the 2020-25 regulatory control period (**RCP**).

The recommendation is based on a new revised forecast trend and takes into account savings due to process efficiencies from the proposed permanent Low Voltage (**LV**) transformer monitoring program, refer Supporting Document 5.15 LV Transformer Monitoring Business Case, SA Power Networks 2020-25 Revised Regulatory Proposal (**Revised Proposal**).

Drivers for change

QoS BAU augex is a continuation of our normal augmentation expenditure required to maintain the service standards on the LV network. It comprises a capital program of enhancement, infill and upgrade works to LV transformers and related assets, including remediation of customer-reported Quality of Supply issues such as over- or under-voltage.

Historically around 1/3 of this expenditure has been associated with each category below:

- general maintenance, safety and capacity work
- addressing under-voltage and other QoS issues
- addressing customer-reported over-voltage issues.

In recent years the amount of expenditure on customer over-voltage issues has been increasing as rooftop solar penetration begins to reach the technical limits of the local network in many areas, and over-voltage conditions become more common in the middle of the day. Figure 1 shows the historical trend of QoS customer enquiries attributable to voltage excursions, outside the mandated limits, caused by solar photovoltaics (**PV**). As seen in the figure, new data received since SA Power Networks 2020-25 Regulatory Proposal (**Original Proposal)** shows that the sharp increasing trend seen in 2017 and 2018 has continued in 2019, with a new record number of enquiries in September 2019, up 33% on the previous year.

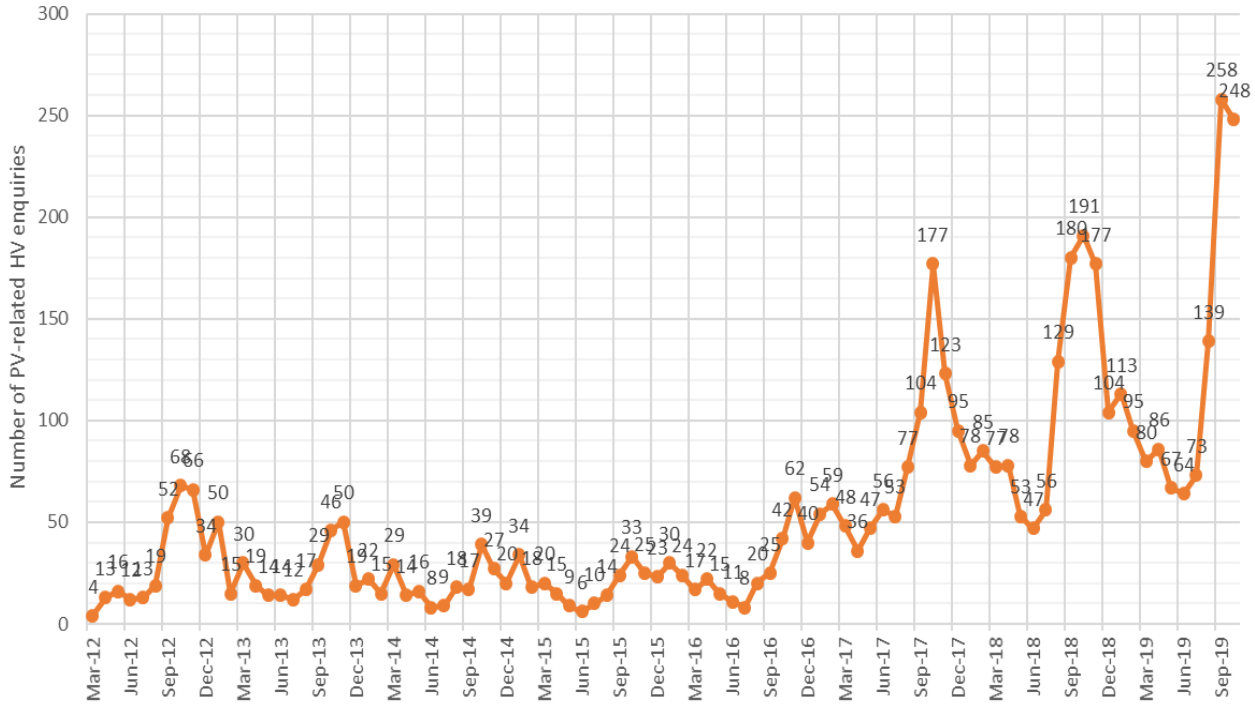

Figure 1: Number of customers completed enquiries PV-related per month

Figure 2 shows the number of formal complaints received by the Energy & Water Ombudsman SA (**EWOSA**) about SA Power Networks' voltage variations from 2015. The number of cases for FY2020 (year-to-date) is expected to exceed the FY2019 value.

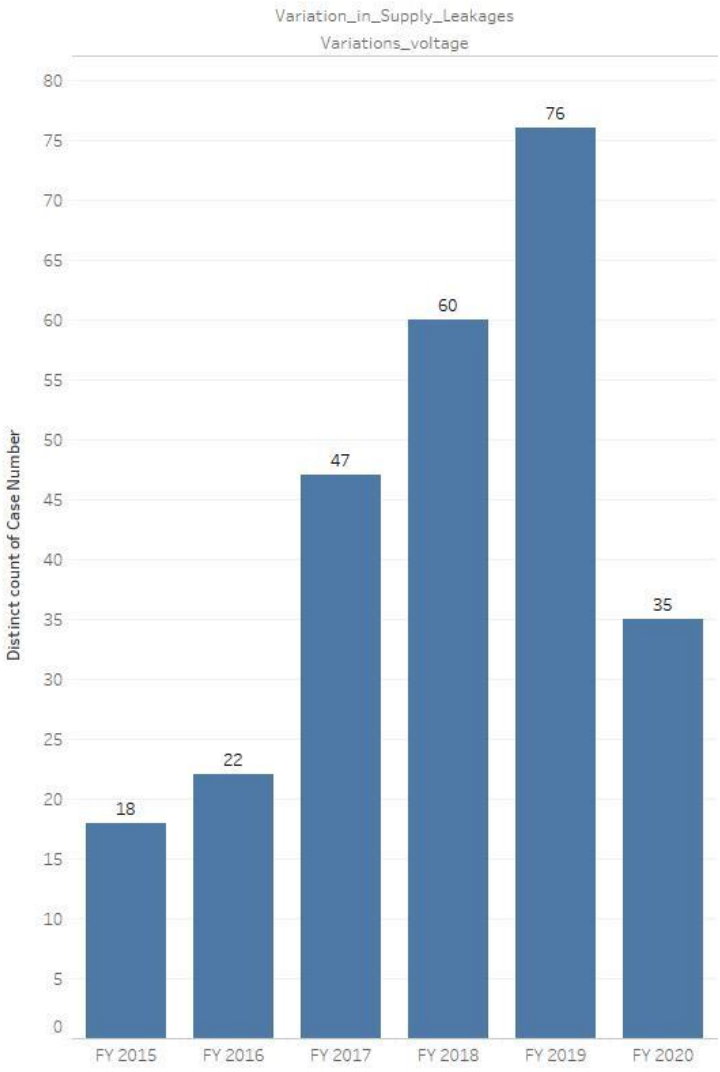

Figure 2. Number of complaints received by EWOSA relating to voltage variations[1]

The increasing number of customer enquiries and the increasing rate of Ombudsman complaints (increasing by approximately 25% annually) indicate that our rate of expenditure on QoS remediation from 2015-20 has not been sufficient to maintain levels of service, and our level of compliance to regulated obligations to maintain voltage at the customer connection point is progressively declining.

Our modelling[2] indicates that this trend will continue through the initial years of the 2020-25 RCP as solar PV penetration continues to grow, moderating from 2023 onwards as our proposed strategic LV management program and other measures to improve voltage management in the LV network begin to come into effect. Consequently, SA Power Networks will not be able to adequately manage QoS issues at the historical average capital expenditure level proposed in the Australian Energy Regulator's (**AER's**), Draft Decision for SA Power Networks Distribution Determination 2020 to 2025 (**Draft Decision**).

As part of comprehensive stakeholder engagement, we convened a specific 'Distributed Energy Resources (**DER**) Integration Working Group' comprising a mix of senior DER industry stakeholders such as retailers and

[1] Graph provided by Energy & Water Ombudsman SA, November 2019

[2] Primarily using the EA Technology Transform model, as described in detail, refer Original Proposal Supporting Document 5.21, EA Technology, LV Management Strategy, report prepared for SA Power Networks, v1.0, December 2018.

technology vendors, as well as representatives from Energy Consumers Australia, the Total Environment Centre, Clean Energy Council, the South Australian Government and the Australian Energy Market Operator (**AEMO**). This working group raised concerns about the potential for further decline in customer service performance in South Australia and supported an uplift in QoS capex (augex) commensurate with maintaining current levels of service.

QoS BAU Capital expenditure (augex) forecast

In many cases it is possible to address customer Quality of Supply issues, at least in the short term, through minor works such as changing voltage ratio transformer taps, or re-balancing low voltage circuits. These low-cost solutions are preferred wherever possible. When minor remedial solutions are exhausted, augmentation becomes necessary. Our BaU augex forecast is based on the projected increase in these more significant remedial works. This forecast has been updated for this revised proposal using the most recent 2018/19 data on actual expenditure.

Figure 3 shows our revised forecast of $46.1 million[3] (blue line), compared with the forecast used in our Original Proposal (brown line) and the level of expenditure approved in the AER's Draft Decision (red line).

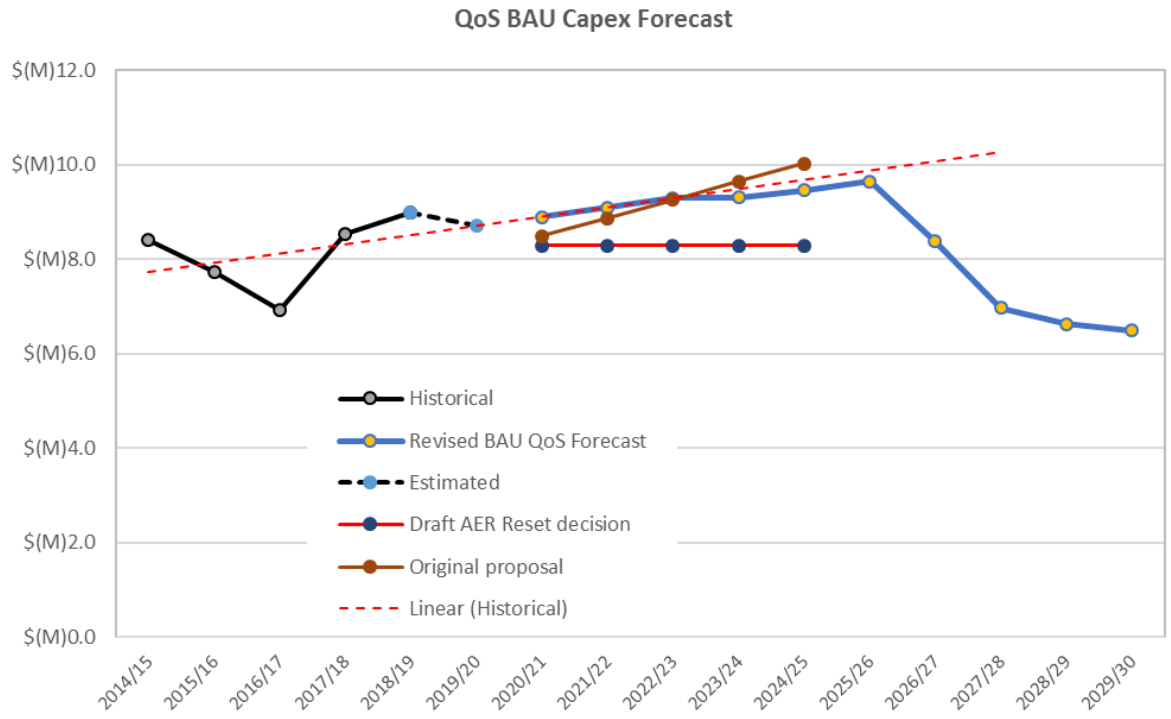

Figure 3. QoS BAU Capex Forecast

Our original forecast used a linear trend based on actual expenditure from 2014 to 2017. Our revised forecast shown in Figure 4 has been updated to incorporate actual expenditure to mid-2019, and predicts higher expenditure in 2020/21, but a lower escalation rate, compared to our original forecast. Our revised forecast also factors in the impact of our proposed permanent LV transformer monitoring program, which is expected to deliver improvements in operational efficiency from 2023 onwards, resulting in a capex saving of $0.4 million in 2023/24 and 2024/25 refer Supporting Document 5.15 LV Transformer Monitoring Business Case, Revised Proposal. These efficiency savings continue from 2025 onwards and combine with longer-term reductions resulting from our strategic LV management program (improved management of customer export limit refer Supporting Document 5.18 LV Management Business Case, Original Proposal), increasing numbers of AS4777.2-compliant inverters (which have improved local voltage management capabilities compared to

[3] Note that all figures in this document include business overheads, whereas the AER in its Draft Determination quotes expenditure excluding business overheads.

pre-2018 inverters), and other measures, to yield further reductions in forecast QoS augex in the 2025-30 RCP.

Figure 4 below shows historical and forecast expenditure broken down by expenditure category.

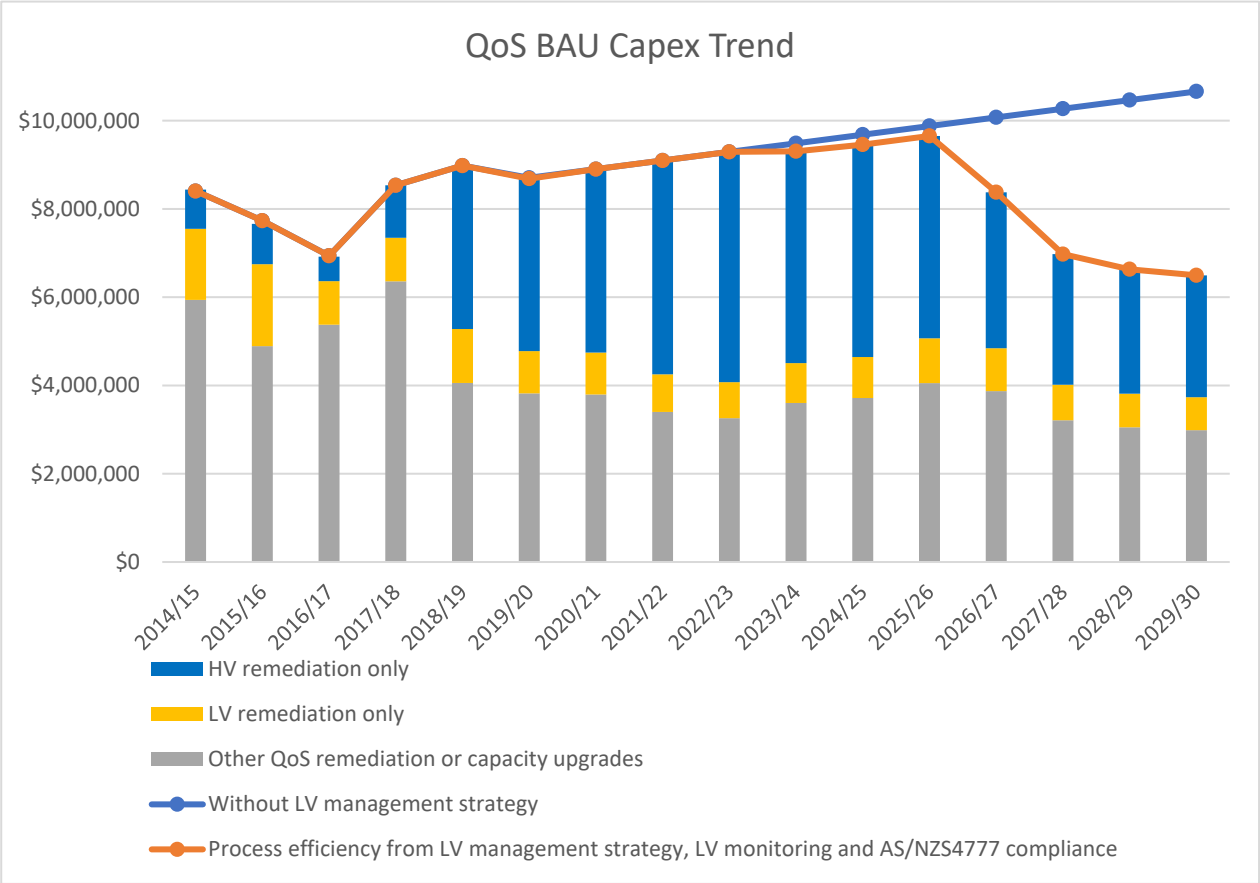

Figure 4. QoS BAU capex forecast showing breakdown of remediation work

The updated forecast capital cost to manage the business as usual function of QoS is summarised in Table 1 below.

Table 1: Updated forecast capex costs of preferred option

Capex ($ million, $2019)

Work package	20/21	21/22	22/23	23/24	24/25	Total
QoS BAU remediation trend	8.9	9.1	9.3	9.5	9.7	**46.5**
QoS BAU reduction (process efficiency)				- 0.2	- 0.2	**- 0.4**
Totals	**8.9**	**9.1**	**9.3**	**9.3**	**9.5**	**46.1**

Recommendation

This submission recommends the continuation of funding for the business as usual function of Quality of Supply, at a total revised and uplift cost of $46.1 million over the 2020-25 regulatory control period based on the revised Quality of Supply and capital expenditure trend which has taken in consideration the benefits from the LV monitoring program, strategic LV management program and AS/NZS 4777.

Shortened Forms

AEMO	*Australian Energy Market Operator*
AER	*Australian Energy Regulator*
augex	*augmentation expenditure*
BAU	*Business as Usual*
capex	*capital expenditure*
DER	*Distributed Energy Resources*
Draft Decision	*AER, Draft Decision for SA Power Networks Distribution Determination 2020 to 2025*
EOI	*Expression of Interest*
EWOSA	*Energy & Water Ombudsman SA*
LV	*low voltage*
PV	*Photovoltaics*
Original Proposal	*SA Power Networks 2020-25 Regulatory Proposal*
QoS	*Quality of Supply*
RCP	*Regulatory Control Period*
Revised Proposal	*SA Power Networks 2020-25 Revised Regulatory Proposal*