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TransGrid
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HA01143 - Cost Estimation Report (rev 1).docx

Dear John

Cost Estimation Report for the Cooma Replacement Project

1. Background

TransGrid's existing 132kV Cooma substation was established in 1954 and is nearing the end of its serviceable life. Consequently, TransGrid is considering the following options for the Cooma replacement project, which is set to take place during the next regulatory period (2009-2014):

- Option (1)** The establishment of a new 132kV substation at Cooma North;
- Option (2)** An in-situ replacement of the existing Cooma Substation, including a replacement of the 132 and 66kV busbars; and
- Option (3)** An in-situ replacement of the existing Cooma Substation, without a replacement of the 132 and 66kV busbars.

TransGrid has requested SKM provide an independent cost estimate for the Cooma project which is currently being assessed by the AER as part of TransGrid's revenue determination for 2009-2014.

Based on the options studies undertaken by TransGrid during the option development stage, SKM would classify this project in the preliminary study phase and expect an order of accuracy in the estimates of between $\pm 15\%$ and $\pm 25\%$.

1.1 Costing Basis

The costs used to compile the estimate are derived from SKM's recent experience on similar projects, manufacturers and an internal Asset Valuation Database. The data within the valuation database is sourced from utilities and manufacturers nationally and has been escalated to 2008 dollars using escalation factors determined from a price escalation study undertaken by SKM.

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1.2 Risks and Factors Which May Impact the Cost

SKM reviewed the project risks and uncertainties as outlined in the options study and concurs with the risks and uncertainties documented by TransGrid.

1.3 Costs Not Included

Costs outside the scope have not been estimated.

1.4 Order of Accuracy of Estimate

TransGrid's scope required an estimate with an order of accuracy of $\pm 25\%$. TransGrid has undertaken a high level options study and developed conceptual drawings for the proposed arrangements. This has led to the development of a preliminary equipment list and identification of the local risks and uncertainties. SKM would classify this project in the preliminary study phase and expect an order of accuracy in the estimate of between $\pm 15\%$ to $\pm 25\%$.

1.5 Limitations of the estimates

All costs estimated in this report have an accuracy of $\pm 25\%$ and are based on the scope of works identified for each option by TransGrid. The prices are in 2008 dollar values.

2. Cost estimation

2.1 Option (1): New substation at Cooma North

SKM reviewed the POSE document for this option (6194B) and notes that the project scope includes the following:

- Property acquisition (4 ha) at Cooma North;
- Civil works at Cooma North;
- Building works at Cooma North;
- Plant and procurement for Cooma North, including the following:
 - Five 132kV switchbays;
 - Two 132kV bus sections;
 - Two 60MVA 132/66kV transformers; and
 - Two 132kV transformer bays.
- Secondary systems for Cooma North;
- Communications for Cooma North, including UGFO cabling;



- Transmission line works (978 line);
- Civil works at the existing Cooma Substation;
- Plant and procurement for the existing Cooma Substation, including the following:
 - Five 66kV switchbays;
 - Two 66kV bus sections; and
 - Two 8MVAr 66kV Capacitor banks.
- Secondary systems for the existing Cooma Substation;
- Communications for the existing Cooma Substation; and
- Switchgear removal for the existing Cooma Substation.

SKM has estimated the cost of this option to be **\$33,503,613** based on the project scope listed above. A breakup of SKM's cost estimate can be found in the attachment.

2.2 Option (2): In-situ replacement of Cooma Substation, including busbar replacement

SKM reviewed the POSE document for this option (6194D) and notes that the project scope includes the following:

- Property acquisition (4775m²);
- Civil works;
- Building works;
- Plant and procurement, including the following:
 - Five 132kV switchbays;
 - One 132kV bus section;
 - Two 60MVA 132/66kV transformers;
 - Two 132kV transformer bays;
 - Two 10MVA 66/11kV transformers;
 - Three 66kV switchbays;
 - Four 66kV transformer bays; and
 - Three 8MVAr 66kV Capacitor banks.
- Secondary systems;
- Transmission line works (97K, 978, 97D lines); and
- In-situ costs.



SKM has estimated the cost of this option to be **\$35,639,724** based on the project scope listed above. A breakup of SKM's cost estimate can be found in the attachment.

2.3 Option (3): In-situ replacement of Cooma Substation, without busbar replacement

SKM reviewed the POSE document for this option (6194E) and notes that the project scope includes the following:

- Property acquisition (3375m²);
- Civil works;
- Building works;
- Plant and procurement, including the following:
 - One 132kV switchbay;
 - One 132kV bus section;
 - Two 60MVA 132/66kV transformers;
 - Two 10MVA 66/11kV transformers;
 - One 66kV transformer bay; and
 - One 8MVAr 66kV Capacitor bank.
- Replacement of all secondary systems; and
- In-situ costs.

SKM has estimated the cost of this option to be **\$22,517,270** based on the project scope listed above. A breakup of SKM's cost estimate can be found in the attachment.

2.3.1 Option to replace busbars at a later date

For Option (3) – In-situ replacement of Cooma Substation, without busbar replacement; TransGrid has asked SKM to provide an estimate of the cost to replace the 132 and 66kV busbars at a later date. SKM notes that the project scope to carry out the busbar replacement includes the following:

- Civil works;
- Plant and procurement, including the following:
 - Five 132kV switchbays;



- One 132kV bus section;
 - Two 132kV transformer bays;
 - Three 66kV switchbays; and
 - Two 66kV transformer bays.
- Transmission line works (97K, 978, 97D lines); and
 - In-situ costs.

SKM has estimated the cost of replacing the busbars at a later date to be **\$17,278,446** based on the project scope listed above. A breakup of SKM's cost estimate can be found in the attachment.

3. Conclusions

After reviewing TransGrid's POSE documents for the Cooma Project, SKM has estimated the following project costs for the respective options:

Option (1) New substation at Cooma North - **\$33,503,613**;

Option (2) In-situ replacement of Cooma Substation, with busbar replacement - **\$35,639,724**;

Option (3) In-situ replacement of Cooma Substation, no busbar replacement - **\$22,517,270**;

(Replacement of busbars at a later date - **\$17,278,446**).

A breakup of SKM's cost estimates can be found in the attachment.

Yours faithfully

[by email]

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Cooma North

Item	Description	Total Cost (AU\$ 2008)
1	Design and Project Management (10% of Sub-Total)	\$ 2,791,968
2	Construction Management, Supervision & Commissioning (5% of Sub-Total)	\$ 1,395,984
3	Contractor Establishment (5% of Sub-Total)	\$ 1,395,984
4	Civil Works - Cooma North	\$ 2,534,830
5	Building Works - Cooma North	\$ 1,120,290
6	Plant & Procurement - Cooma North	\$ 8,525,817
7	Secondary Systems - Cooma North	\$ 2,398,940
8	Other Lump Sum - Cooma North	\$ 1,391,000
9	Transmission Line	\$ 2,695,820
10	Civil Works - Cooma	\$ 973,700
11	Plant & Procurement - Cooma	\$ 3,000,280
12	Secondary Systems - Cooma	\$ 1,284,000
13	Other Lump Sum - Cooma	\$ 535,000
14	Switchgear removal - Cooma	\$ 3,010,000
15	Property - Cooma	\$ 450,000
16	Sub-Total (total asset and allowance cost)	\$ 27,919,677
17	Total Project Cost	\$ 33,503,613

Cooma (In Situ) - With Busbar Replacement

Item	Description	Total Cost (AU\$ 2008)
1	Design and Project Management (10% of Sub-Total)	\$ 2,969,977
2	Construction Management, Supervision & Commissioning (5% of Sub-Total)	\$ 1,484,988
3	Contractor Establishment (5% of Sub-Total)	\$ 1,484,988
4	Civil Works	\$ 4,396,490
5	Building Works	\$ 1,370,290
6	Plant & Procurement	\$ 12,462,854
7	Secondary Systems	\$ 3,691,500
8	Transmission Line	\$ 1,000,000
9	Property	\$ 200,000
10	In-Situ Costs	\$ 6,578,636
11	Sub-Total (total asset and allowance cost)	\$ 29,699,770
12	Total Project Cost	\$ 35,639,724

Cooma (In Situ) - Without Busbar Replacement

Item	Description	Total Cost (AU\$ 2008)
1	Design and Project Management (10% of Sub-Total)	\$ 1,876,439
2	Construction Management, Supervision & Commissioning (5% of Sub-Total)	\$ 938,220
3	Contractor Establishment (5% of Sub-Total)	\$ 938,220
4	Civil Works	\$ 4,396,490
5	Building Works	\$ 1,370,290
6	Plant & Procurement	\$ 5,509,994
7	Secondary Systems	\$ 3,691,500
8	Transmission Line	\$ -
9	Property	\$ 200,000
10	In-Situ Costs	\$ 3,596,118
11	Sub-Total (total asset and allowance cost)	\$ 18,764,392
12	Total Project Cost	\$ 22,517,270

Cooma (In Situ) - Cost to Replace 66kV and 132kV Busbars at a later Date

Item	Description	Total Cost (AU\$ 2008)
1	Design and Project Management (10% of Sub-Total)	\$ 1,439,870
2	Construction Management, Supervision & Commissioning (5% of Sub-Total)	\$ 719,935
3	Contractor Establishment (5% of Sub-Total)	\$ 719,935
4	Civil Works	\$ 3,155,290
5	Building Works	\$ -
6	Plant & Procurement	\$ 7,032,604
7	Secondary Systems	\$ -
8	Transmission Line	\$ 1,000,000
9	Property	\$ -
10	In-Situ Costs	\$ 3,210,811
11	Sub-Total (total asset and allowance cost)	\$ 14,398,705
12	Total Project Cost	\$ 17,278,446