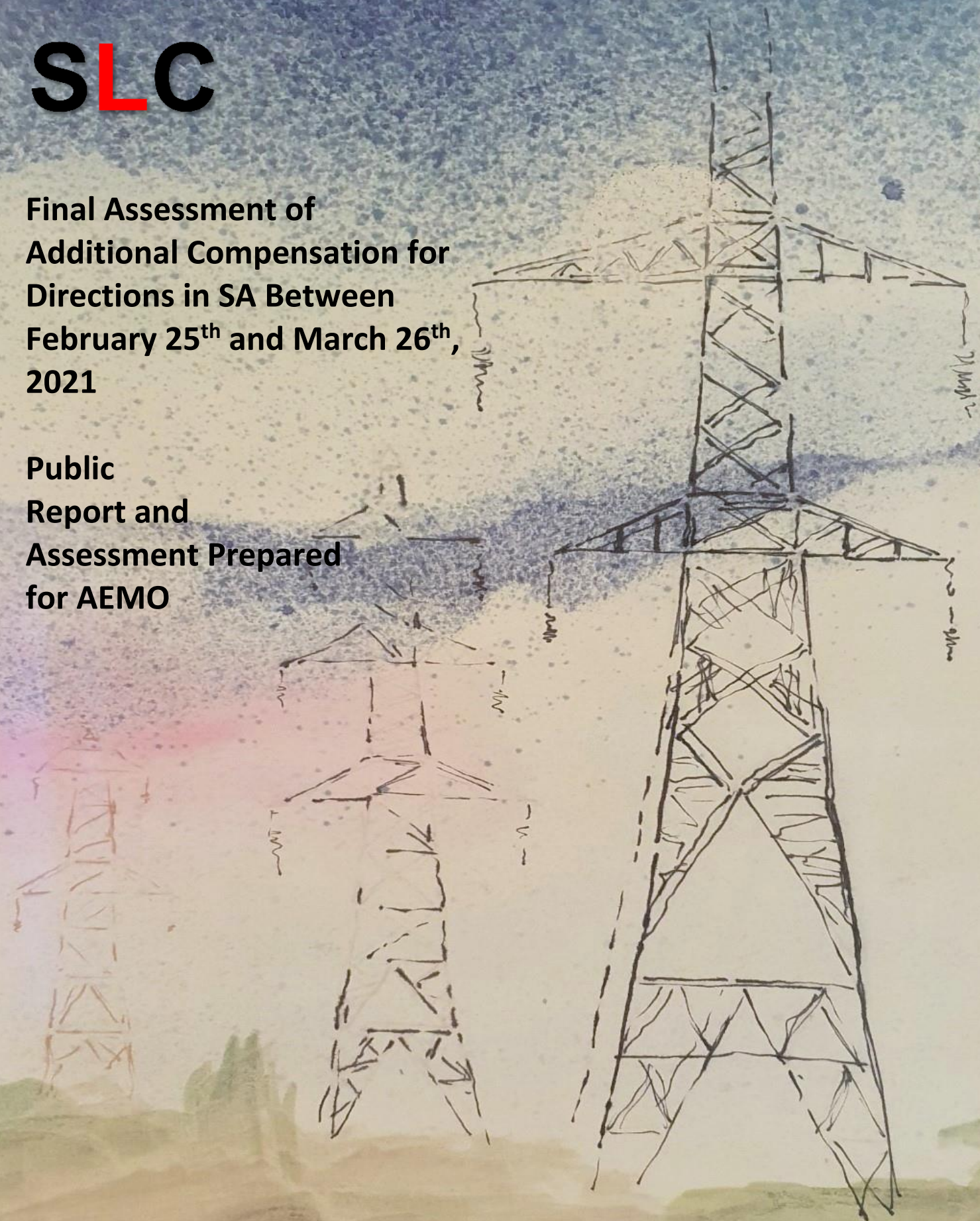




**Final Assessment of
Additional Compensation for
Directions in SA Between
February 25th and March 26th,
2021**

**Public
Report and
Assessment Prepared
for AEMO**



**Sam Lovick Consulting
July 2021**

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A handwritten signature in black ink is located in the bottom right corner of the page. The signature is stylized and appears to be 'SLC'.

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1. Introduction

This report is prepared for the Australian Energy Market Operator (AEMO) in accordance with the requirements of clause 3.12.3(c)(4) of the National Electricity Rulesⁱ (NER).

Sam Lovick Consulting (SLC) was appointed by AEMO as an independent expert to determine clause 3.15.7B additional compensation owing for *directions* to *Directed Participants* issued in South Australia between Thursday February 25th 2021 and Friday March 26th 2021 relating to 20 *directions* covering periods Friday February 26th 11:00 to Saturday March 27th 14:20. These are summarised in Table 1.

Table 1. Summary of *directions*

Claim ID	Event	Issued at	Start date and time	End date and time
Claim A	1-1	25 Feb 2021 23:30	26 Feb 2021 11:00	27 Feb 2021 17:00
Claim B	1-1	27 Feb 2021 6:00	27 Feb 2021 9:30	28 Feb 2021 17:30
Claim C	1-1	27 Feb 2021 18:40	28 Feb 2021 10:00	7 Mar 2021 17:00
Claim D	1-2	28 Feb 2021 19:45	1 Mar 2021 10:00	2 Mar 2021 14:30
Claim E	1-4	1 Mar 2021 14:30	2 Mar 2021 4:00	3 Mar 2021 16:00
Claim F	1-1	7 Mar 2021 17:30	8 Mar 2021 10:00	12 Mar 2021 15:00
Claim G	1-1	9 Mar 2021 10:00	9 Mar 2021 11:00	10 Mar 2021 14:00
Claim H	1-1	11 Mar 2021 5:00	12 Mar 2021 4:00	12 Mar 2021 17:30
Claim I	1-2	12 Mar 2021 15:15	13 Mar 2021 1:30	16 Mar 2021 4:00
Claim J	1-2	12 Mar 2021 15:15	13 Mar 2021 2:00	14 Mar 2021 18:30
Claim K	1-2	13 Mar 2021 1:00	13 Mar 2021 9:00	14 Mar 2021 23:00
Claim L	1-4	16 Mar 2021 0:01	16 Mar 2021 4:00	16 Mar 2021 15:30
Claim M	1-1	17 Mar 2021 18:00	18 Mar 2021 0:00	18 Mar 2021 16:30
Claim N	1-1	17 Mar 2021 18:00	18 Mar 2021 1:00	18 Mar 2021 18:00
Claim O	1-2	18 Mar 2021 19:00	19 Mar 2021 4:00	20 Mar 2021 16:30
Claim P	1-2	19 Mar 2021 17:00	20 Mar 2021 0:30	22 Mar 2021 5:00
Claim Q	1-2	20 Mar 2021 22:10	21 Mar 2021 1:00	21 Mar 2021 14:30
Claim R	2-1	23 Mar 2021 16:30	24 Mar 2021 1:00	25 Mar 2021 4:00
Claim S	2-1	23 Mar 2021 16:30	24 Mar 2021 1:30	25 Mar 2021 16:30
Claim T	4-1	26 Mar 2021 17:00	27 Mar 2021 1:00	27 Mar 2021 16:30

AEMO determined that these were *directions* for *system strength services* to maintain the system in a secure operating state. The 20 *directions* covered four different *Directed Participants*.

1.1. Circumstances of the *Directions*

The *Directions* did not result from any particularly unusual events within the National Electricity Market (NEM) at that time. Rather, they were a consequence of supply and demand on the network at the time and the mix of generation available and operating to meet that

ⁱ The period of the *directions* was covered by four versions of the National Electricity Rules, versions 157 to 160. None of the revisions in these versions were relevant to this determination. The rules are available at <https://www.aemc.gov.au/regulation/energy-rules/national-electricity-rules/historical-versions>. Unless otherwise stated, references to clauses within this report refer to NER v160.

demand. AEMO determined that offered resources at the time did not provide adequate *system strength services*. The *directions* were necessary to ensure that generators capable of providing *system strength services* that were scheduled to shut down instead remained synchronised.

1.2. Compensation for the *Directed Participants*

AEMO determined compensation for these *directions* under clause 3.15.7, which defines a formula for compensating *Directed Participants* for the provision of *energy* and *market ancillary services* based on the 90th percentile *spot price* or *ancillary service price* over the preceding year. AEMO informed the *Directed Participants* of these compensation amounts.

System strength services are neither *energy* nor *market ancillary services* within the NER so there is no formulaic mechanism for determining compensation for its provision. Clause 3.15.7A sets out how compensation to *Directed Participants* for services other than *energy* or *market ancillary services* should be determined. However, clause 3.15.7A(a1) excludes services where the *direction* would have been unnecessary had the *Directed Participants* made a *dispatch bid*. *Energy*, *system strength services* and, to some degree, FCAS are joint products. Had *dispatch bids* for *energy* or FCAS been made for these directed units, there would not have been a need for *directions* for *system strength services*. Accordingly, and in accordance with clause 3.15.7A(a2), compensation for *system strength services* in these cases are to be determined under clause 3.15.7. Furthermore, while the *directions* were for *system strength services*, they were enacted by way of *directions* for *energy*, dictating compensation for *energy* as a directed service under clause 3.15.7.

The *Directed Participants* sought additional compensation under clause 3.15.7B in respect of the foregoing *directions*. All these claims met the thresholds set out in clause 3.15.7B(c)(1) for referral to an independent expert.

2. *Directed Participants'* claims

AEMO provided SLC with details of the clause 3.15.7 compensation claims and correspondence with the *Directed Participants* concerning their claims. SLC called for submissions from the *Directed Participants* as required by clause 3.12.3(c)(2) prior to preparing this report. The *Directed Participants* submitted additional information in support of their claims.

2.1. Clause 3.15.7B claims

The *directed* participants provided spreadsheets detailing three cost elements for each *direction*:

- the costs of purchasing fuel to provide the directed services;
- a share of the charges levied by AEMO *market generators* to recover the costs of Contingency Raise FCAS; and
- variable operating and maintenance (VOM) costs.

For each *direction*, they claimed these costs minus the amount of compensation received for directed *energy* calculated according to clause 3.15.7.

2.2. Initial submissions

The *Directed Participants* provided within the prescribed time limit in respect of each *direction*, a letter summarising the compensation that was sought, signed by an officer, certifying that data supplied was true and correct as required by clause 3.15.7B(b)(3). They also provided spreadsheets detailing the calculations made to determine the amount of additional compensation. The *Directed Participants* also supplied copies of invoices for fuel supplied covering the periods of the *directions*.

2.3. Draft determinations

On the basis of this AEMO material and the submissions, SLC provided a draft public reportⁱⁱ and confidential draft assessments to AEMO and the directed participants in July 2021.

2.4. Further submissions

SLC called for further submissions from the *Directed Participants* in response to these drafts as required by clause 3.12.3(c)(2) prior to preparing this final report. The *Directed Participants* did not make any further written submissions but met with SLC to discuss aspects of the drafts. These discussions were duly considered.

3. Clause 3.15.7B compensation provisions of the NEM

Clause 3.15.7B compensates *Directed Participants* for (clause 3.15.7B(a)):

- (1) the aggregate of the loss of revenue and additional net direct costs incurred by the *Directed Participant* in respect of a *scheduled generating unit*, *semi-scheduled generating unit* or *scheduled network services*, as the case may be, as a result of the provision of the service under *direction*; less
- (2) the amount notified to that *Directed Participant* pursuant to clause 3.14.5A(g), clause 3.15.7(e) or clause 3.15.7A(f); less
- (3) the aggregate amount the *Directed Participant* is entitled to receive in accordance with clause 3.15.6(c) for the provision of a service rendered as a result of the *direction*.

3.1. Net direct costs

'Net direct costs' is not a defined term in the NEM, but clause 3.15.7B(a3) sets out, without limitation, seven examples of net direct costs including fuel costs. It is clear from these examples that the term 'net direct costs' encompasses all costs incurred by the *Directed Participant* that would not have been incurred absent the *direction*, and this is the interpretation that has been adopted in the past by independent experts making clause 3.15.7B determinations.

ⁱⁱ Sam Lovick Consulting (July 2021) *Independent Draft Determination of Additional Compensation for Directions in SA Between February 25th and March 26th, 2021* available at https://aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/market_event_reports/2021/draft-report-sa-directions-billing-weeks-9-12-2021.pdf?la=en.

Fuel costs clearly meet this definition. Since the *Directed Participants* did not need to make additional starts or stops to comply with the *directions*, they did not incur any additional start costs; the *Directed Participants* were correct not to claim start costs.

Generators also incur variable operating and maintenance costs when they generate which are not fuel related. These can include, for example, raw water costs, waste and wastewater disposal costs, chemical costs, lubricants and other consumables.ⁱⁱⁱ Generators may also incur additional labour costs when generating, in so far as they have flexibility over staffing when not operating. We are satisfied that, but for the *directions*, the units would not have operated, which would have resulted in some VOM cost savings. Accordingly, some VOM costs are compensable under clause 3.15.7B(a3).

None of the seven examples of net direct costs in clause 3.15.7B(a3) exactly matches Contingency Raise FCAS recovery charges. Nevertheless, for the reasons set out in prior compensation determinations,^{iv} if the generators had not been directed, they would not have produced any *generator energy* and would not have been charged for Contingency Raise FCAS recovery. Accordingly, Contingency Raise FCAS recovery is a net direct cost for the purposes of clause 3.15.7B.

AEMO provided settlement data on Contingency Raise FCAS recovery charges which the *Directed Participants* used to determine their compensation claims.

3.2. Adjustment for revenues received

To determine total compensation, clause 3.15.7B(a)(2) requires that compensation for the directed services calculated according to clauses clause 3.14.5A, 3.15.7 and 3.15.7A is deducted from net direct costs. The market was not suspended during these *directions*, so no revenue was earned under clause 3.14.5A. For the reasons set out above, no revenue was payable under clause 3.15.7A. Revenue was paid to the *Directed Participants* calculated according to clause 3.15.7(c), termed DCP. Excepting two claims, which were corrected, the *Directed Participants* appropriately calculated and deducted DCP from their additional compensation claims.

Clause 3.15.7B(a)(3) requires that revenues defined in clause 3.15.6(c) are also deducted. In previous determinations of compensation,^v this has been interpreted to require deduction of *trading amounts* for non-directed *market ancillary services* to determine allowable additional compensation. The *Directed Participants* did not receive any *trading amounts* for *market ancillary services* during these *directions*, so no deductions were required.

ⁱⁱⁱ CAISO (2018) Variable Operations and Maintenance Cost available at <http://www.caiso.com/Documents/VariableOperationsandMaintenanceCostReport-Dec212018.pdf> (last viewed 23 June 2021).

^{iv} Sam Lovick Consulting (August 2020) *Independent Expert Draft Determination of Additional Compensation 'Package 2' Directions Between February 2nd and February 9th 2020* available at https://aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/market_event_reports/2020/200805-final-report.pdf?la=en.

^v *Ibid.*

4. Calculations of the claimed amounts

The *Directed Participants* submitted letters claiming additional compensation and spreadsheets in support of the claimed amounts. The spreadsheets incorporated embedded documents including copies of invoices for fuel and support for other cost elements. We identified a number of minor miscalculations in the spreadsheets and discrepancies between the letters and the spreadsheets. These were brought to the attention of the *Directed Participants* and were corrected in the draft assessments. No further corrections were needed for this final determination.

4.1. Clause 3.15.7B(a)(1) claims for loss of revenue

The *Directed Participants* did not seek additional compensation for loss of revenue under clause 3.15.7B(a)(1).

4.2. Clause 3.15.7B(a)(1) claims for additional net direct costs

The *Directed Participants* sought compensation for additional net direct costs under clause 3.15.7B(a)(1) for fuel costs, VOM and Contingency Raise FCAS recovery charges.

4.2.1 Fuel consumption

For each of the claims, the *Directed Participants* provided an Excel spreadsheet setting out aggregate fuel consumption across a group of generating units. This was evidenced with matching metering data. Fuel consumption for each *Directed Participant* in each period was based on the trading load of the *Directed Participant* in that period divided by the sum of all trading loads (to which the metered fuel data applied) in that same period.

Metering data was unavailable for a small number of settlement periods. The *Directed Participants* made estimates of fuel consumption in these periods which were consistent with typical periodic consumption and with metered generation in the period. The estimates were appropriate.

In accordance with previous determinations for additional compensation for the same *Directed Participants*,^{vi} it was unnecessary to adjust these derived consumptions to take account of differences in heat rates across the generating fleet. The claimant's approach based on each *Directed Participant's* share of total trading load across the fleet is appropriate.

The data and calculations submitted by the *Directed Participants* were sufficient to substantiate the claims in respect of fuel consumption.

4.2.2 Fuel costs

The *Directed Participants* provided invoices for fuel purchases covering the period of the whole of the duration of the *directions* with prices denominated in \$/GJ. In all cases, the quantity of fuel referenced in the invoices was enough to supply the *Directed Participants* across all the claims.

^{vi} *Ibid.*

The invoices indicated two sources of fuel with different unit prices. The *Directed Participants* indicated that the different sources were separately metered. Metering data indicated the quantum of fuel used from each source that was consumed by the generation fleet during the period of the *directions*.

The *Directed Participants* estimated the unit cost of fuel across the fleet as the average price of fuel across the two sources weighted by the quantity of fuel used from each source. Total fuel costs were determined as the product of this unit cost and the quantity consumed by the *Directed Participants* as set out in section 4.2.1 above.

The approach is appropriate, and the data and calculations submitted were sufficient to substantiate their claims in respect of fuel costs.

4.2.3 VOM costs

The *Directed Participants* provided estimates of VOM for each directed unit denominated in \$/hour derived from a confidential report prepared in 2008. They provided a copy of sections of the report that related to VOM. They indexed this amount to 2021 terms using an inflation rate of 2.5% per annum. They claimed the resultant costs for each settlement period of each *direction*.

We accept that generators incur VOM costs, but we have some reservations about the compensation approach adopted by the *Directed Participants*. Specifically, the VOM estimates were given in \$/hour terms, they were based on data that is 13 years old, and there is no detail on the derivation of the figures in the citation. As a result, it is not possible to verify whether the estimates are accurate reflections of current VOM costs.^{vii}

VOM costs are more typically expressed in terms of \$/MWh of sent out generation.^{viii} For example, AEMO in its assumptions for its 2022 Integrated System Plan (ISP)^{ix} denominates VOM in this way. This accords with other sources.^x These sources suggest VOM for the technologies in question of between \$0.5/MWh and \$2.4/MWh. When the *Directed Participants'* estimates of VOM are converted to \$/MWh terms based on the quantum of directed energy, the resultant figures ranges between \$2.99 and \$3.21/MWh. This is above the figure that AEMO uses for equivalent technologies for planning purposes and above the level cited by CAISO in the US.^{xi}

^{vii} We have previously accepted data from the same source in support of start costs. However, in that instance, the report provided greater detail on derivation of the figures.

^{viii} We note that VOM costs can comprise elements based on energy sent out and components based on duration of operation. For example, chemicals costs associated with emission abatement tend to vary with energy sent out; the costs of scheduled maintenance based on hours of operation brought forward due to longer running hours will vary with hours of operation.

^{ix} AEMO (2020) *2020 Inputs and assumptions workbook* available at <https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp/current-inputs-assumptions-and-scenarios>.

^x See, for example, CAISO *op cit*, footnote iii.

^{xi} *Ibid.*

We also reviewed the indexation approach adopted by the *Directed Participant*. In our view, it would be more appropriate to base any indexation on changes in ABS All groups CPI for Adelaide between the March quarters 2021 and 2008.^{xii} This would have resulted in a 30% escalation of the 2008 VOM figures rather than the 38% escalation calculated by the *Directed Participants*.

Given the lack of detail of the VOM costs supplied by the *Directed Participants*, the issue with indexation, and the level of these costs when expressed in \$/MWh, we have determined that VOM compensation for these claims should be limited to the AEMO ISP \$/MWh figure for the units in question.^{xiii} This reduced the VOM claims by around 25%. Our estimate of overall compensation for these *directions* has been adjusted accordingly.

We recognise that the VOM claims from the same *Directed Participants* have been accepted by other independent experts in their draft determinations.^{xiv} Nevertheless, we believe that the adjustments we have made better reflect the requirements of the NER.

The *Directed Participants* discussed this approach with SLC after receiving the draft assessments of compensation. They noted that AEMO uses a similar approach for actual settlement of affected participant compensation and elected not to make a further submission on the matter. Accordingly, the approach that SLC used in its draft assessments is used without change in the final assessments.

4.2.4 Charges for Contingency Raise FCAS recovery

The *Directed Participants* submitted spreadsheets detailing AEMO charges for Contingency Raise FCAS recovery separated into 6 second, 60 second and 5 minute classes. The spreadsheets allocated the sum of those charges in proportion to trading load (i.e., using essentially the same approach used to allocate fuel consumption to each unit, as set out in section 4.2.1). This reflects the allocation principles set out in clause 3.15.6A(f).

The approach is appropriate, and the data and calculations submitted were sufficient to substantiate their claims in respect of Contingency Raise FCAS recovery.

4.3. Revenue deductions

For the reasons set out in section 3.2, clause 3.15.7B requires that compensation for directed services and entitlements to *trading amounts* from non-directed services are deducted from costs to determine additional compensation.

^{xii} ABS (June 2021). *6401.0 Consumer Price Index, Australia*. Table 5, series A2325821J available at <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release#data-download>.

^{xiii} AEMO's VOM figures were last updated in 2020. Accordingly, they were inflated to current terms.

^{xiv} Synergies Economic Consulting (June 2021) *Additional compensation claims arising from AEMO directions between 25 January and 25 February 2021 DRAFT DETERMINATION* available at https://aemo.com.au/-/media/files/electricity/nem/market_notices_and_events/market_event_reports/2021/draft-determination-bws-5--8-2021.pdf?la=en

4.3.1 Compensation for directed services

The *Directed Participants* provided spreadsheets detailing the compensation for each *direction* for directed *energy*.^{xv} The 90th percentile prices, quantum of services provided, and compensation payments determined under clause 3.15.7(c) for these services were provided to them by AEMO in accordance with clause 3.15.7(e). These compensation amounts need to be deducted from net direct costs under clause 3.15.7B(a)(2); they were appropriately deducted from the net direct costs in these claims. There were no other directed services.

4.3.2 Revenue for services that are not directed

In previous determinations for additional compensation, *Directed Participants* also earned *trading amounts* for *market ancillary services* which had to be deducted from the additional compensation claims. For these *directions*, the *Directed Participants* provided settlement data that indicated that they did not provide any *market ancillary services* for the duration of the *directions*. Accordingly, no deductions for *trading amounts* for non-directed services were necessary.

4.4. Total additional compensation

Based on the foregoing, we have determined that the total amount of clause 3.15.7B compensation payable to the *Directed Participants* in respect of the 20 *directions* is \$2,068,029.

^{xv} In *directions* for *system strength services*, AEMO treats energy as directed.