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# Illustrative EBSS Mechanisms

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A report for ActewAGL

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# 1. Introduction

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HoustonKemp has been asked to prepare this report by ActewAGL Distribution (ActewAGL). This report follows on from the expert report of Greg Houston for ActewAGL entitled *Opex and the Efficiency Benefit Sharing Scheme*, dated January 2015. The context of both these reports is the Australian Energy Regulator's (AER's) draft decision in relation to the distribution determination applying to ActewAGL for the period commencing on 1 July 2014 through to 30 June 2019 (the draft decision).<sup>1</sup>

Specifically, ActewAGL has asked HoustonKemp to provide a report that provides one or more illustrative Efficiency Benefit Sharing Schemes (EBSS) that could operate where the distribution network service provider's (DNSP's) operating expenditure (opex) allowance in the following regulatory period may be set on the basis of either the network's revealed opex costs or by reference to comparative efficiency.

## 1.1 Key findings

In this report we find that under the current regulatory framework the incentives for efficient opex in any regulatory control period arise from the combined effect of:

- the method adopted by the regulator for resetting the opex allowance in the subsequent regulatory period; and
- the form of the EBSS mechanism that provides an adjustment to subsequent regulatory period revenues for differences between forecast and outturn opex during the current regulatory control period.

A consequence of the incentives for efficient opex being a product of both the method for setting future opex allowance and the EBSS mechanism, is that the appropriate form of the EBSS can only be determined after it has been decided which method is to be used to set the opex allowance for the subsequent period (ie, to use revealed cost or comparative efficiency).

We note that the provisions in the National Electricity Rules (the rules) in relation to the EBSS do not require a single mechanism to be developed. It would be possible for the regulator to develop a suite of EBSS mechanisms that would correspond to different possible methods for resetting the opex allowance, that would in each instance impart the following incentive attributes, ie:

- provide the DNSP with both rewards for any opex efficiency gains and penalties for any efficiency losses incurred during the regulatory control period;
- result in penalties and rewards that are *invariant as to the timing* at which those efficiency or gains or losses occurred during the regulatory period; and
- a sharing ratio of approximately 30:70 between the DNSP and its customers, thereby aligning the opex incentives with:
  - > the capex incentives provided by the capital expenditure sharing scheme (CESS); and
  - > the service standard incentives produced by the service target performance incentive scheme (STPIS).

Section 3 of this report provides illustrative examples of forms of EBSS that would deliver the desired incentives, ie:

- calculating an EBSS carry-forward reward or penalty using the **incremental EBSS**, where the opex allowance is reset using the DNSP's revealed costs; and

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<sup>1</sup> Australian Energy Regulator, *Draft decision, ActewAGL distribution determination 2015-16 to 2018-19*, November 2014

- calculating an EBSS carry-forward reward or penalty using a **NPV EBSS**, where the opex allowance is reset by reference to comparative efficiency.

## 1.2 Structure of this report

This report is structured as follows:

- section 2 sets out the principles and incentives that EBSS incentive mechanisms are intended to provide DNSPs; and
- section 3 provides an illustration of two alternative forms of EBSS mechanism that provide incentive characteristics consistent with these principles, and could be applied depending on whether future opex allowances are set on the basis of revealed costs or comparative efficiency.

## 2. Incentive Principles

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In this section, we summarise the principles that are relevant for developing and implementing an EBSS incentive mechanism, as set out in the NER, and recognised and applied by the AER.

It is important to recognise that the term EBSS is used in the rules to describe the incentive mechanism applied by the AER to opex. There is no requirement for there to only be a single EBSS. The appropriate form of EBSS may vary depending on particular circumstances, a point that was previously recognised by the AER in the stakeholder forum during development of the Better Regulation EBSS guideline.<sup>2</sup>

### 2.1 Principles set out in the NER

The NER requires the EBSS to provide for a fair sharing of the efficiency gains and losses in opex between distributors and network customers.<sup>3</sup> Furthermore, in developing and implementing the EBSS, the AER must have regard to:<sup>4</sup>

- the need to ensure that benefits to electricity consumers likely to result from the scheme are sufficient to warrant any reward or penalty under the scheme;
- the need to provide distributors with a continuous incentive, so far as is consistent with economic efficiency, to reduce opex;
- the desirability of both rewarding distributors for efficiency gains and penalising distributors for efficiency losses;
- any incentives that distributors may have to capitalise expenditure;
- the incentives distributors have to make service improvements; and
- the possible effects of the scheme on incentives for the implementation of non-network alternatives.

#### 2.1.1 Benefits to consumers

The EBSS should provide incentives to encourage distributors to efficiently reduce opex through time. Providing appropriate opex incentives to distributors will over time encourage more efficient, and so lower, opex outcomes. The benefits associated with lower opex outcomes can then be passed through to consumers by way of lower required revenues for distributors.

Further, the AER also states that the appropriate incentive strength of the EBSS is one where the benefits (costs) of any increase (decrease) in opex is shared approximately 30:70 between a DNSP and its consumers.<sup>5</sup>

#### 2.1.2 Continuous incentive to reduce opex

The EBSS should provide distributors with a continuous incentive to achieve efficiencies in opex, so far as is consistent with economic efficiency. The AER has interpreted 'continuous incentive' to mean that the incentive for a distributor to improve efficiency should be equal in each year of the regulatory control period.<sup>6</sup> That is, the marginal benefit to a distributor of improving efficiency by a given amount should be the same

<sup>2</sup> AER incentives and expenditure assessment forum – Models – 29 April 2013.

<sup>3</sup> NER, cl.6.5.8(a).

<sup>4</sup> NER, cl.6.5.8(c).

<sup>5</sup> AER, *Draft Position | Better Regulation | Explanatory statement Proposed Efficiency Benefit Sharing Scheme*, August 2013, page 13.

<sup>6</sup> AER, *Final Decision | Efficiency Benefit Sharing Scheme for the ACT and NSW 2009 Distribution Determinations*, February 2008, page 24.

regardless of the year in which the reduction occurs. In this way, if a distributor makes a one-off reduction to opex, an ongoing reduction to opex, or shifts costs between years, the benefit (or penalty) of doing so is the same irrespective of the regulatory year in which the change occurs.

The AER has recognised that continuous incentives are crucial if the EBSS is to consistently encourage efficiency and timely opex throughout the regulatory period and encourage distributors to reveal their efficient costs.<sup>7</sup> If the EBSS does not provide continuous incentives, distributors may be instead inclined to shift opex from a year where the marginal benefit of underspending (or the marginal cost of overspending) is relatively high, to another year where the marginal benefit of underspending (or the marginal cost of overspending) is relatively low, even when it is not efficient to do so.

### 2.1.3 Symmetrical treatment of efficiency gains and losses

The EBSS should both reward distributors for efficiency gains, and penalise them for efficiency losses. The AER has previously noted that the symmetrical application of positive and negative carryovers is important for the continuity of incentives to improve efficiency, where future opex forecasts are based on revealed costs.<sup>8</sup> Specifically, without the application of both positive and negative carryover amounts, distributors would face significant incentives to shift opex into the base year of the regulatory control period in order to increase forecasts for the following regulatory period. This would, in turn, undermine the ability of the EBSS to provide distributors with the incentive to reveal their efficient costs.

### 2.1.4 Incentives to capitalise expenditure

The EBSS (and its interaction with any capex incentive scheme) should ensure that distributors do not have an incentive to inappropriately capitalise expenditure. This incentive will not arise in circumstances where opex and capex incentives are balanced, since the distributor will effectively receive the same benefit (or incur the same loss) whether the expenditure is capitalised or not. However, where the EBSS is not matched by an equivalent incentive scheme applying to capex, differences in the treatment of efficiency gains and losses may result in the distributor favouring capex over opex, or vice versa.

The CESS framework has an explicit incentive sharing mechanism that results in any increase or decrease in capex to be shared 30:70 between a DNSP and its consumers. Consequently, an EBSS that delivers a 30:70 sharing ratio will align opex and capex incentives and so remove the incentive for a distributor to inappropriately capitalise expenditure.

### 2.1.5 Incentives to improve service standards

Under the Service Target Performance Incentive Scheme (STPIS) a DNSP receives a reward (or penalty) for service improvements (declines). The STPIS shares the benefits (costs) of service improvements (declines) between DNSPs and consumers on a 30:70 basis. As a result, an EBSS that also shares the benefits (costs) of any increase (decrease) in opex on a 30:70 basis between the distributor and its customers will provide appropriate signals to a DNSP of efficient trade-offs between higher (lower) opex and improvements (declines) in service standards.

### 2.1.6 Incentives for the implementation of non-network alternatives

The EBSS (and its interaction with the CESS) should not distort the incentives for distributors to implement non-network alternatives. Expenditure on non-network alternatives generally takes the form of opex rather than capex, and results in the distributor spending less on capex (such as network augmentations) than it otherwise would have. The operation of the schemes should ensure that a distributor retains an incentive to

<sup>7</sup> AER, *Final Decision | Efficiency Benefit Sharing Scheme for the ACT and NSW 2009 Distribution Determinations*, February 2008, page 24.

<sup>8</sup> AER, *Final Decision | Efficiency Benefit Sharing Scheme for the ACT and NSW 2009 Distribution Determinations*, February 2008, page 19.

implement a non-network alternative only if the increase in opex is less than the corresponding decrease in capex.

## 2.2 Other principles recognised by the AER

In addition to the principles set out in the NER, the AER has also noted that the EBSS should:<sup>9</sup>

- meet the NEL objective;
- be simple to understand and apply;
- be predictable;
- require minimal adjustments;
- not impose a significant administrative burden;
- not affect the financial viability of the regulated firm; and
- be capable of separating out the impact of exogenous events outside the control of distributors.

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<sup>9</sup> AER, *Preliminary Positions | Matters Relevant to Distribution Determinations for ACT and NSW DNSPs for 2009-2014*, November 2007, page 22; AER, *Final Decision | Efficiency Benefit Sharing Scheme for the ACT and NSW 2009 Distribution Determinations*, February 2008, pages 8-30

### 3. Illustrative Examples of Alternative EBSS Forms

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Greg Houston in his January 2015 expert report<sup>10</sup> showed that there are profound, negative consequences for the efficiency incentives faced by a distributor from both:

- the application of the current EBSS in a situation where the future opex allowance is set by reference to comparative efficiency; and
- the abandonment of any EBSS.

Consequently, the opex incentives associated with the AER's draft decision for ActewAGL result in a substantial departure from the principles set out in section 2. In light of this, it is imperative that the AER defines an EBSS framework in its final decision for ActewAGL that is capable of meeting the incentive properties that the NER and AER have indicated as important. In this section, we provide an example of how such a framework might operate.

Consistent with the discussion in section 2, the form of EBSS applied to a DNSP should seek to impart the following incentive attributes:

- ensure that the DNSP is both rewarded for any opex efficiency gains and penalised for any efficiency losses incurred in a given year;
- are invariant as to the timing at which those efficiency or gains or losses occurred in the regulatory period; and
- result in any efficiency gains or losses are shared in the ratio of approximately 30:70 between the DNSP and its customers and so aligns the opex incentives with:
  - > the capex incentives provided by the CESS; and
  - > the service standard incentives produced by the STPIS.

The efficiency incentive arrangements in relation to opex in a given regulatory period arise from three fundamental features of the regulatory framework for DNSPs, namely:

- whether there is any claw back for differences between forecast and outturn opex during a regulatory period;
- the basis on which the opex allowance is reset for the following period; and
- the form of the EBSS mechanism.

Since there is no intention to introduce a mechanism that claws back any differences between forecast and outturn opex during a regulatory period, incentives for efficient opex will arise from the combined effect of the method adopted for resetting the opex allowance for the following period and the form of the EBSS applied. As a consequence, the appropriate form of EBSS can be expected to differ, depending on the method for resetting the opex allowance for the following period.

In this section we will illustrate that the desired incentives, as set out in section 2 of this report, will be delivered by:

- calculating an EBSS carry-forward reward or penalty relating to outcomes in the current regulatory period using the existing 'incremental EBSS', when the opex allowance for the next regulatory period has been reset on the basis of the DNSP's revealed costs; and

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<sup>10</sup> Greg Houston, *Opex and the Efficiency Benefit Sharing Scheme*, January 2015.

- calculating an EBSS carry-forward reward or penalty relating to outcomes in the current regulatory period using a net present value EBSS (NPV EBSS), when the opex allowance for the next regulatory period has been reset by reference to comparative efficiency.

An important consequence of the intrinsic link between the method for setting the opex allowance and the EBSS is that the form of the EBSS that should be applied can only be determined after the AER has decided on the method for setting the opex allowance for the following regulatory period (ie, to use revealed cost or comparative efficiency or some other approach). In other words, unless the regulator commits to a single method for setting the future opex allowance it is not possible to define a single formulation of the EBSS that will operate during the regulatory period to deliver the required incentives.

### 3.1 Form of EBSS where opex allowance is reset using revealed cost: 'incremental EBSS'

In this scenario we consider the appropriate form of EBSS to calculate the carry forward amount where the opex allowance for the following period is reset on the basis of the revealed opex costs of a DNSP in a "base year" of the current period (typically the penultimate year of the current regulatory period).

In Greg Houston's January 2015 report he demonstrated that the existing EBSS (the 'incremental EBSS') as set out in the Better Regulation guideline, together with the future opex allowance being reset by reference to the revealed opex costs of a DNSP in a "base year" ensures that:<sup>11</sup>

- incentives are symmetric, so that a DNSP is both rewarded for any opex efficiency gains and penalised for any efficiency losses incurred in a given year;
- incentives are *invariant as to the timing* at which those efficiency or gains or losses occurred in the regulatory period;
- any efficiency gains or losses are shared in the ratio of approximately 30/70 between the DNSP and its users; and
- the incentives accord with those applying to capex and service quality.

Below we illustrate that these outcomes would also be achieved in circumstances where the opex allowance for the current regulatory period is set by reference to comparative efficiency, but the future allowance is determined on the basis of revealed costs. In this circumstance, a DNSP that currently has its opex allowance set by reference to comparative efficiency would effectively be restarting the incremental EBSS. Consequently, the year 1 incremental efficiency gain (loss) under the incremental EBSS approach would be calculated as the difference between forecast opex and outturn opex (ie, consistent with the approach set out in the AER's guideline for the period in which the incremental EBSS is first applied).<sup>12</sup>

Figure 1 illustrates a scenario where the opex allowance for the DNSP for the first regulatory period is set at 80 units, on the basis of comparative efficiency. Outturn opex in year 1 is above the allowance at 100 units. The DNSP manages to lower its opex over the regulatory period, such that by year 5 it reaches the allowed (benchmark) level. The period 2 opex allowance returns to being set on the basis of revealed costs.

Figure 1 demonstrates that the operation of the incremental EBSS will deliver outcomes consistent with the principles outlined in section 2, with the DNSP bearing 30 percent of the difference between actual and allowed opex, and customers bearing 70 per cent.<sup>13</sup>

<sup>11</sup> Greg Houston, *Opex and the Efficiency Benefit Sharing Scheme*, January 2015, page 30.

<sup>12</sup> See AER, *Electricity distribution network service providers | Efficiency benefit sharing scheme | Final explanatory material*, June 2008, page 5.

<sup>13</sup> Total costs to reach the benchmark efficient opex levels is 47.2 units, in present value terms, with the DNSP bearing a penalty of 13.9 units (in NPV terms) and customers bearing 33.3 units (in NPV terms).

Figure 1 – Illustration of a DNSP reaching benchmark efficient levels of opex in year 5, and the future opex allowance being based on revealed costs

Year	Period 1					Period 2					Future
	1	2	3	4	5	6	7	8	9	10	
Forecast ( $F_t$ )	80	80	80	80	80	85	85	85	85	85	80 p.a.
Actual ( $A_t$ )	100	95	90	85	80	80	80	80	80	80	80 p.a.
Underspend ( $F_t - A_t = U_t$ )	-20	-15	-10	-5	0	5	5	5	5	5	5 p.a.
Incremental efficiency gain ( $I_t = U_t - U_{t-1}$ )	-20	5	5	5	5	0	0	0	0	0	0 p.a.
Carryover ( $I_1$ )		-20	-20	-20	-20	-20					
Carryover ( $I_2$ )			5	5	5	5	5				
Carryover ( $I_3$ )				5	5	5	5	5			
Carryover ( $I_4$ )					5	5	5	5	5		
Carryover ( $I_5$ )						0	0	0	0	0	
Carryover amount ( $C_t$ )						-5	15	10	5	0	
Total cost of opex to customers	80	80	80	80	80	80	100	95	90	85	80 p.a.
Benefits to NSP ( $F_t - A_t + C_t$ )	-20	-15	-10	-5	0	0	20	15	10	5	0
Benefits to consumers ( $F_1 - (F_t + C_t)$ )	0	0	0	0	0	0	-20	-15	-10	-5	0
Discounted benefits (costs) to NSP	-20.0	-14.2	-8.9	-4.2	0.0	0.0	14.1	10.0	6.3	3.0	0.0
Discounted benefits (costs) to consumers	0.0	0.0	0.0	0.0	0.0	0.0	-14.1	-10.0	-6.3	-3.0	0.0
Discounted total benefits (costs)	-20.0	-14.2	-8.9	-4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note: All present value calculation in year 1 dollars, and adopting a 6% real discount rate.

Consequently, the incremental EBSS mechanism set out the AER’s Better Regulation EBSS guideline is an example of a mechanism that will deliver the desired incentive properties where the opex allowance for the next regulatory period is reset on the basis of the revealed opex costs of the DNSP, regardless of whether the current opex allowance has been set on the basis of revealed costs or a comparative efficiency analysis.

### 3.2 Form of EBSS where opex allowance is reset based on comparative efficiency: ‘NPV EBSS’

A DNSP that has its opex allowance for the next regulatory period set exogenously by reference to the opex efficiency of a group of comparable companies requires a substantially different formulation of the EBSS to be applied to any efficiency gains (losses) made in the current period, than that which should operate when the opex allowance is set on the basis of the DNSP’s revealed opex.

An illustrative EBSS that could operate under an exogenous opex allowance was developed by the AER and presented to a joint stakeholder forum following the initiation of the Better Regulation expenditure incentives guideline on the 29 April 2013. This EBSS was entitled *EBSS Model – NPV sharing ratio with a single increment/decrement* (the NPV EBSS).

Under the NPV EBSS an adjustment is made in the first year of each regulatory period to bring forward (in present value terms) 70 per cent of the difference between target opex and actual opex that occurred in the immediately preceding regulatory control period. This ensures that opex efficiency gains or losses are shared in the ratio of 30:70 between the DNSP and its customers.

Figure 2 provides an illustrative example, where a DNSP makes a one off opex saving in year 2 of 10 units. To ensure the appropriate 30:70 sharing ratio, 70 percent of this opex saving is brought forward in present value terms and deducted from the DNSP’s revenue allowance in year 6.<sup>14</sup>

Figure 2 – Illustration of a one-off opex efficiency gain in year 2: both current and future opex set based on comparative efficiency

Discount rate: 6%  
Sharing ratio: 30%

Year	1	2	3	4	5	6	7	8	9	10
Target (F)	100	100	100	100	100	100	100	100	100	100
Actual (A)	100	90	100	100	100	100	100	100	100	100
Underspend (F-A)	0	10	0	0	0	0	0	0	0	0
Discount factor	1	0.943	0.89	0.84	0.792	0.747	0.705	0.665	0.627	0.592
PV underspend	0	9.434	0	0	0	0	0	0	0	0
Increment/decrement						-8.837				
Target for pricing purposes	100	100	100	100	100	91.16	100	100	100	100

The NPV EBSS would also deliver the appropriate incentives where a DNSP’s opex allowance for the current regulatory period had been set by reference to its revealed costs, but in the forthcoming regulatory period the opex allowance is reset by reference to the efficiency of a group of comparable companies.

An illustration of how the NPV EBSS could operate in this scenario is provided in Figure 3. In this example, the DNSP has consistently overspent its opex allowance and so, rather than rely on its revealed opex in year 4 (the base year), the opex allowance in years 6-10 has been reset by reference to some form of benchmarking of comparative opex efficiency.

Figure 3 shows that the present value of the overspends in years 2 to 5 (ie, over spends of 5, 10, 15 and 17) equals 39.7 units. This is fully born by the DNSP in the first regulatory period. Consequently, in order to appropriately share the costs of these overspends, the NPV EBSS provides a positive carry forward adjustment in year 6 of 37.17 units (which is equal to 27.77 in present value terms).<sup>15</sup> This delivers the desired 30:70 sharing of the cost of these overruns between the DNSP and its customers.

We note that this approach is consistent with the calculation of the appropriate EBSS carry forward amount that Greg Houston identified in his January 2015 report to account for differences between ActewAGL’s forecast and outturn opex during the 2009-14 regulatory control period, if the AER were to set ActewAGL’s 2014-19 opex allowance on the basis of a comparative efficiency assessment.<sup>16</sup>

<sup>14</sup>  $8.337 = (100 - 90) \times (1 - 30\%) \times (1 + 6\%)^4$

<sup>15</sup>  $27.77 = 37.17 \times 0.747$

<sup>16</sup> Greg Houston, *Opex and the Efficiency Benefit Sharing Scheme*, January 2015, page 19.

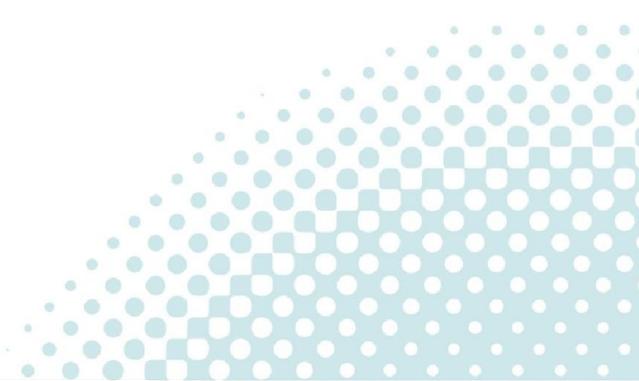
Figure 3 – Illustration of NPV EBSS in a situation of opex overruns and the use of benchmarking to determine the future opex allowance

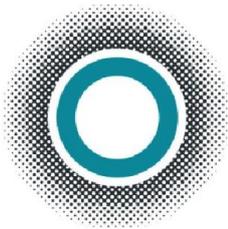
Discount rate: 6%  
 Sharing ratio: 30%

Year	1	2	3	4	5	6	7	8	9	10
Target (F)	100	100	100	100	100	80	80	80	80	80
Actual (A)	100	105	110	115	117	80	80	80	80	80
Underspend (F-A)	0	-5	-10	-15	-17	0	0	0	0	0
Discount factor	1	0.943	0.89	0.84	0.792	0.747	0.705	0.665	0.627	0.592
PV underspend	0	-4.72	-8.90	-12.59	-13.47	0	0	0	0	0
Increment/decrement						37.17				
Target for pricing purposes	100	100	100	100	100	117.2	80	80	80	80

We note that the NPV EBSS would deliver the desired incentive properties because:

- it delivers symmetric incentives with the DNSP being equally rewarded for efficiency savings and penalised for efficiency losses;
- the incentive is invariant through time with the DNSP rewarded (penalised) with 30 per cent of the present value of any differences between its opex allowance and outturn opex; and
- it ensures that efficiency gains or losses are shared in the ratio of 30:70 between the DNSP and its customers and so aligns opex incentives with those that apply to capex and service standards.





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