Final decision

# Electricity distribution network service providers

# Efficiency benefit sharing scheme

June 2008

AUSTRALIAN ENERGY REGULATOR

# Contents

# Shortened forms

| | |
|---|---|
| AER | Australian Energy Regulator |
| capex | capital expenditure |
| DNSP | distribution network service provider |
| EBSS | efficiency benefit sharing scheme |
| ENA | Energy Networks Association |
| ESCOSA | Essential Services Commission of South Australia |
| ICRC | Independent Competition and Regulatory Commission |
| MEU | Major Energy Users Inc |
| NEL | National Electricity Law |
| NEM | National Electricity Market |
| NER | National Electricity Rules |
| NPV | net present value |
| opex | operating expenditure |
| RFM | roll-forward model |
| TNSP | transmission network service provider |
| WACC | weighted average cost of capital |

# 1 Introduction

The Australian Energy Regulator (AER) is responsible for regulating the revenues of distribution network service providers (DNSPs) in the National Electricity Market (NEM) in accordance with the National Electricity Law (NEL) and the National Electricity Rules (NER).

Under the NER, the AER is required to develop and publish certain models, guidelines and schemes. The efficiency benefit sharing scheme has been developed to provide for a fair sharing between DNSPs and distribution network users of operating expenditure (opex) efficiency gains and losses.

On 1 April 2008, the AER released and invited submissions on the following proposed guidelines, schemes and models that are required to be published under chapter 6 of the NER:

- post-tax revenue model (PTRM)
- roll forward model (RFM)
- cost allocation guidelines
- efficiency benefit sharing scheme (EBSS)
- service target performance incentive scheme (STPIS).

In addition, the AER held a public forum in Melbourne on 23 April 2008 relating to its proposed guidelines, schemes and models and to receive comments from stakeholders.

The AER received 16 written submissions on its proposed guidelines package which are available on the AER's website, www.aer.gov.au.

This final decision sets out the AER's consideration of comments raised in these submissions in relation to the proposed EBSS. Stakeholders that provided submissions are listed at appendix A of this final decision.

In developing this final decision, consideration has been given to the objectives of the NEL and the NER and the submissions received. The AER received 11 submissions from stakeholders in relation to the proposed EBSS. Issues raised in the submissions have been addressed in this final decision but have not resulted in any substantive changes between the proposed and the final EBSS.

# 2 Rule requirements

Clause 6.5.8 of the NER requires the AER to develop and publish the EBSS and sets out the requirements the AER must comply with in doing so. It provides:

> **6.5.8 Efficiency benefit sharing scheme**
>
> (a) The *AER* must, in accordance with the *distribution consultation procedures*, develop and *publish* a scheme or schemes (*efficiency benefit sharing scheme*) that provide for a fair sharing between *Distribution Network Service Providers* and *Distribution Network Users* of:
>
> (1) the efficiency gains derived from the operating expenditure of *Distribution Network Service Providers* for a *regulatory control period* being less than; and
>
> (2) the efficiency losses derived from the operating expenditure of *Distribution Network Service Providers* for a *regulatory control period* being more than,
>
> the forecast operating expenditure accepted or substituted by the *AER* for that *regulatory control period*.
>
> (b) An *efficiency benefit sharing scheme* may (but is not required to) be developed to cover efficiency gains and losses related to capital expenditure or *distribution losses*.
>
> (c) In developing and implementing an *efficiency benefit sharing scheme*, the *AER* must have regard to:
>
> (1) the need to ensure that benefits to consumers likely to result from the scheme are sufficient to warrant any reward or penalty under the scheme for *Distribution Network Service Providers*; and
>
> (2) the need to provide *Distribution Network Service Providers* with a continuous incentive, so far as is consistent with economic efficiency, to reduce operating expenditure and, if the scheme extends to capital expenditure, capital expenditure; and
>
> (3) the desirability of both rewarding *Distribution Network Service Providers* for efficiency gains and penalising *Distribution Network Service Providers* for efficiency losses; and
>
> (4) any incentives that *Distribution Network Service Providers* may have to capitalise expenditure; and
>
> (5) the possible effects of the scheme on incentives for the implementation of non-network alternatives.
>
> (d) The *AER* may, from time to time and in accordance with the *distribution consultation procedures*, amend or replace an *efficiency benefit sharing scheme*.

The distribution consultation procedures in rule 6.16 of the NER require the AER to publish a proposed EBSS, an explanatory statement and an invitation for submissions. Stakeholders must be allowed at least 30 business days to make submissions to the AER. Within 80 business days of publishing the proposed EBSS the AER must publish its final decision and the EBSS.

The AER has developed and published this final decision and the EBSS in accordance with the AER's obligations under rule 6.16 and clause 6.5.8 of the NER.

# 3 Reasons for the efficiency benefit sharing scheme

It is generally accepted that firms are better placed than a regulator to effectively judge whether a particular project or organisational structure reflects efficient production. In the presence of this information asymmetry, the AER considers it is preferable to apply a light-handed approach to regulation, while providing a system of broad financial incentives to induce the firm to operate efficiently.

The nature of the financial incentives employed by the regulator will influence the actions of the firm. For example, such incentives might encourage a firm to reduce or increase its costs or to enhance or reduce the reliability of the services it provides.

The power of the incentive to achieve a particular objective depends on the sensitivity of the firm's future profit stream to changes in the firm's efforts to pursue that objective. The more sensitive the future profit stream, the greater is the incentive to pursue that objective.

In the case of incentives to improve efficiency, the most common way to increase the power of the incentive is for the regulator to leave the regulated prices unchanged for a fixed period of time (usually five years). This introduces a lag between the time the firm improves efficiency and the time those new efficiencies are reflected in regulated prices. This increases the sensitivity of the present value of the firm's profit stream to changes in its actual costs.

The AER considers that a regulatory regime that relies on providing efficiency incentives to DNSPs is preferable to an approach which attempts to micro manage their business decisions.

Where the regulator would like a firm to pursue multiple objectives, the power of the incentives to pursue these different objectives should be balanced wherever possible. For example, if the incentive to maintain service standards is weak, introducing high powered expenditure incentives increases the risk that the firm will cut service standards in order to reduce expenditure.

The AER considers past expenditure, among other things, when determining future expenditure allowances. Thus a DNSP, knowing that its current level of expenditure is likely to affect future expenditure allowances, will take this into account when choosing its level of effort to improve efficiency. Specifically, if lower expenditure today leads to lower expenditure allowances tomorrow, the DNSP may be more reluctant to reduce its expenditure today (that is, the power of the incentive will be reduced).

Under the building block approach to regulation, a DNSP that is able to reduce expenditure near the beginning of the regulatory control period is able to retain the benefits of the reduction longer than if it were to reduce expenditure closer to the end of the regulatory control period. Consequently, the power of the incentive reduces as the regulatory control period progresses. Furthermore, if forecast expenditure allowances are specifically set with reference to a previous year, the incentive for a DNSP to reduce expenditure in that year is likely to be reduced.

The EBSS addresses these issues by providing an incentive for the DNSP to reveal its efficient level of expenditure through the retention of efficiency gains for five regulatory years after the regulatory year in which the gain is made. The EBSS calculates the revenue increment or decrement that reflects any efficiency gains or losses in order to provide a fair sharing between distribution network users and DNSPs. The revenue increments/decrements are derived from the operating expenditure (opex) of DNSPs being less/more than the forecast opex.

# 4 Proposed efficiency benefit sharing scheme

On 1 April 2008 the AER published its proposed EBSS, accompanied by an explanatory statement. The proposed EBSS had a number of features.

First, the proposed EBSS calculated efficiency gains or losses on an incremental basis. That is, the efficiency gain or loss for a particular regulatory year would be calculated as the difference between actual and forecast opex in that regulatory year less the difference in the preceding regulatory year. Since actual opex in the final regulatory year of a regulatory control period is not known at the time the AER makes a DNSP's revenue determination, opex would be estimated assuming the efficiency gain in the final regulatory year was equal to zero. The efficiency gain or loss in the first regulatory year of the following regulatory control period would be adjusted to account for differences between the estimate and the actual expenditure amount of the final regulatory year of the current regulatory control period.

Second, the proposed EBSS required the AER to be satisfied that the forecast and actual opex used to calculate the carryover amounts accurately reflected the costs faced by the DNSP in the current regulatory control period. The EBSS required adjustments to be made, where necessary, to correct for variances in cost categories and methodologies and errors.

Under the proposed EBSS, the AER defined four default adjustments to the actual and forecast opex amounts used to calculate carryover gains and losses. These adjustments excluded the cost consequences of:

- changes in capitalisation policy
- differences between forecast and actual demand growth over the regulatory control period
- recognised pass through events
- non-network alternatives.

Further, the AER proposed to permit a DNSP to nominate as part of its regulatory proposal any additional cost categories it considered to be uncontrollable. These categories were required to be specific to the business, involve an identifiable reason for being excluded, and not involve an ongoing business activity. If the AER also considered these additional cost categories to be uncontrollable they would be excluded from the operation of the EBSS.

The AER proposed that the EBSS would operate on a symmetric basis and all carryovers, both positive and negative, would be applied and carried over for the duration of the carryover period. This would ensure constant and symmetric incentives. The carryover period was proposed to be equal to the duration of the regulatory control period, typically five years.

The AER proposed a carryover period of five years except where a longer regulatory control period is approved. Where this is the case, the AER would consider permitting a longer carryover period.

Under the proposed EBSS it was possible for DNSPs to generate a positive carryover amount by substituting opex for capex. To determine whether these actions were inconsistent with the intended operation of the EBSS, the AER proposed that a DNSP explain any changes in its capitalisation policy, specifically detailing:

- any change in capitalisation policy and why the change was made
- any change in factors that affect levels of maintenance or levels of opex, such as technological change
- the effect of the changes on the recognition of opex and capex.

Clause 6.5.8(b) of the NER provides for (but does not require) the AER to develop an EBSS covering efficiency gains and losses relating to capex and distribution losses. The proposed EBSS did not apply to capex or distribution losses. The AER considered that it was desirable in principle to provide DNSPs with a continuous incentive to make capex efficiency gains, but concluded that applying the EBSS to capex may provide inappropriate incentives to defer capex to a following regulatory control period. Regarding distribution losses, the AER considered that there was no compelling evidence to suggest that the current level of distribution losses is inappropriate and that a scheme was necessary.

The proposed EBSS was designed using the scheme for transmission network service providers (TNSPs) as a basis. The EBSS was proposed after the AER's consideration of the similarities and differences of DNSPs and TNSPs, the requirements under chapter 6 of the NER and the input from stakeholders who responded to the proposed EBSS. After consideration of the issues raised by stakeholders, the AER has concluded that it is appropriate to apply an EBSS to DNSPs.

# 5 Issues raised in submissions and the AER response

## 5.1 Consistency with EBSS for transmission

Consistent with the EBSS for TNSPs, the proposed EBSS for DNSPs was an incremental carryover type scheme. Some stakeholders, however, considered that such a scheme was not appropriate for application to DNSPs.

### 5.1.1 Stakeholder comments

The Independent Competition and Regulatory Commission (ICRC) expressed concerns about applying an incremental carryover scheme to DNSPs which was consistent with that applied to TNSPs. It stated its:

> … primary concern is that the incremental scheme as proposed by the AER places inordinate importance on forecast operating costs.[1]

The ICRC noted that under the EBSS, DNSPs would gain five dollars through carryover amounts for every extra dollar of opex allowed in the base year[2] of the regulatory control period.[3] The ICRC suggested that an alternative approach would be to place a 'deadband' around forecast costs and reward or penalise a business only if actual opex falls outside the deadband.

### 5.1.2 AER conclusion

Table 1 outlines the benefit to a DNSP of an extra dollar in allowed opex for each regulatory year of the regulatory control period.

**Table 1 NPV benefit to a DNSP of an extra dollar of allowed opex**

| *Regulatory year in which $1 extra of opex is allowed* | *NPV of benefit to DNSP, $* | |
|---|---|---|
| | *With EBSS* | *Without EBSS* |
| 1 | 0.30 | 1 |
| 2 | 0.28 | 0.94 |
| 3 | 0.26 | 0.89 |
| 4 | 4.14 | 0.84 |
| 5 | 0.23 | 0.79 |
| Every regulatory year | 5.21 | 4.47 |

Note: Assumes regulatory year 4 is the forecast base year for forecasts for the following regulatory control period and a real discount rate of 6 per cent.

1 ICRC, *Submission on the Australian Energy Regulator's service target performance incentive scheme and efficiency benefit sharing scheme*, May 2008, p. 4.

2 In this final decision a single regulatory year in the current regulatory control period used as a basis for forecasts in the following regulatory control period is referred to as the base year.

3 ICRC, op. cit. p. 4.

Since opex is largely recurrent, it is important to also consider the impact of a forecasting error in all years of the regulatory control period and not just in a single regulatory year. As shown in table 1, the impact of the EBSS when the opex allowance for all the regulatory years of the regulatory control period is increased by one dollar is relatively small—the DNSP benefits by $5.21 with the EBSS compared to $4.47 without the EBSS.

The AER recognises that the impact of a one dollar increase in forecast opex is significantly more for the base year. However, as opex is largely recurrent the AER does not consider the risk of gaming by DNSPs is a sufficient enough concern to outweigh the benefits of having the EBSS in place. The AER considers that the EBSS will improve the confidence with which forecast opex amounts can be determined. This is because the continuous incentive the EBSS provides for a DNSP to reduce its opex throughout the regulatory control period is ultimately encouraging a DNSP to reveal its efficient level of opex. Under the EBSS, a DNSP does not benefit from shifting costs to, or increasing costs in, the regulatory year in which future opex forecasts will be based.

The AER considers that the incremental nature of the scheme provided by the EBSS best meets the requirements of the clause 6.5.8 of the NER compared to alternative approaches, including the use of deadbands. The AER does not consider that a deadband approach would provide a continuous incentive to reduce opex, which is a matter that the AER must have regard to under clause 6.5.8(c)(2) of the NER.

The AER accordingly considers it appropriate to apply, consistent with the scheme for TNSPs, an incremental carryover scheme.

## 5.2 Service classification

Some stakeholders questioned how the EBSS will deal with changes in service classification between regulatory control periods.

### 5.2.1 Stakeholder comments

Aurora Energy questioned how the EBSS will deal with changes in service classification. Aurora Energy stated it:

> … notes that the EBSS applies to standard control services only. To the extent that services are classified differently between regulatory control periods, it is not clear if carry-over amounts from a previous regulatory control period will remain appropriate, or how any required revenue adjustments (as a result of services re-classifications) will be accommodated in the EBSS.[4]

Ergon Energy suggested that 'adjustments may also be required to accommodate changes to service classifications between regulatory control periods'.[5]

---

4 Aurora Energy, *AER guidelines schemes and models*, May 2008, p. 2.

5 Ergon Energy, *op. cit.*, p. 5.

### 5.2.2 AER conclusion

In order for the EBSS to provide a continuous incentive, the AER considers forecast opex in the following regulatory control period should be based on actual opex in either the penultimate or antepenultimate regulatory year in the current regulatory control period. However, the forecast would need to account for any of the services that do not remain classified as standard control services in the following regulatory control period or services that are added in the following period. The AER notes where there is a high likelihood that a particular service would not be classified as a standard control service in the following regulatory control period, a DNSP may seek to shift costs out of the base year in order to maximise the carryover payments received under the EBSS.

If EBSS carryover amounts are paid for efficiency gains relating to services that do not remain classified as standard control services, the cost of these carryover amounts will be borne by consumers of standard control services rather than the consumers of the relevant service.

The AER considers that it would be inappropriate for carryover amounts to be awarded for efficiency gains relating to services that do not remain classified as standard control services in the following regulatory control period. Therefore, where this is the case, the AER may remove the opex relating to the service from the actual and forecast opex figures used to calculate carryover amounts if it considers it appropriate to do so. In determining whether to do so, the AER will consider such factors as the materiality of the impact on carryover amounts and the associated potential for, and magnitude of, cross-subsidies, and whether there is any evidence of the DNSP inappropriately shifting costs to maximise carryover payments.

## 5.3 Inclusion of capex in the EBSS

Stakeholders raised a number of issues regarding the inclusion of capex in the EBSS. Views put forward by stakeholders on this issue were mixed.

### 5.3.1 Stakeholder comments

A number of stakeholders, including Alinta, United Energy, CitiPower and Powercor, the Energy Networks Association (ENA), Envestra and ETSA Utilities, stated that capex should be included in the EBSS, or that DNSPs should have the option to have an EBSS apply to their capex. For example, the ENA stated:

> A distributor should have the choice to propose a capital efficiency scheme where it is willing to expose itself to the risks of such a scheme. Such a scheme may play an important role in sustaining incentives for non-network solutions to localised constraints.[6]

[6] ENA, *Response to proposed guidelines, models and schemes for electricity distribution networks*, May 2008, pp. 3–4.

CitiPower and Powercor argued that the incentive to defer capex provided by applying the EBSS to capex would not be inappropriate since:

> … deferral of capital expenditure remains an option only to a certain point, after which service standards start to decline resulting in offsetting penalties through the Service Incentive Scheme and low levels of public satisfaction with the distributor's performance.[7]

CitiPower and Powercor did not consider the 're-submitting' of deferred capex projects to be a significant concern since the AER can consider outturn capex when determining the capex allowance for subsequent regulatory control periods.[8]

Other stakeholders, such as Energex and Ergon Energy, supported the AER's proposal to not include capex in the EBSS.[9, 10]

SPA Consulting Engineers stated that any EBSS applying to capex should acknowledge that a significant proportion of capex comes directly from developers[11]

### 5.3.2 AER conclusion

The AER considers that where practicable an EBSS should apply to both opex and capex where this provides balanced incentives to encourage efficiencies across both forms of expenditure. However, for a cumulative capex scheme to provide continuous incentives it is necessary that deferred capex be excluded from capex allowances in subsequent regulatory control periods. The AER maintains that were a cumulative carryover scheme applied to capex, and deferred capex was not excluded from capex allowances, such a scheme would deliver inappropriate incentives to defer capex to a later regulatory control period. Modelling undertaken by the AER demonstrates that DNSPs would retain significantly more than 30 per cent of the benefits of the capex deferral (see appendix C).

The AER considers that it is not practicable to systematically exclude deferred capex from capex allowances. While clause 6.5.7(e)(5) of the NER requires the AER to have regard to the actual and expected capex of a DNSP during any preceding regulatory control period when assessing that DNSP's capex proposal, as set out in clause 6.5.7(e) of the NER, this is only one of a range of factors to which the AER must have regard. The AER considers that for a capex scheme to operate appropriately, DNSPs must know with a high degree of certainty that any capex that is deferred will be excluded from capex allowances in subsequent regulatory control periods. The AER does not consider that it can provide that certainty under current the provisions.

---

7 CitiPower and Powercor, *Proposed electricity distribution network service provider guidelines*, May 2008, p. 4.

8 ibid.

9 Energex, *Energex's response to the AER's nation guidelines, models and schemes*, May 2008, p. 10.

10 Ergon Energy, op. cit., p. 6.

11 SPA Consulting Engineers, *Submission on proposed electricity distribution models*, May 2008.

The AER recognises that customer contributions form a significant portion of DNSPs' capex. The AER agrees with SPA Consulting Engineers that any further consideration of an EBSS that is applied to capex should take account of this.

Consequently the AER has determined that it will not apply the EBSS to capex at this time. However, should a means of addressing the AER concerns regarding inappropriate incentives to defer capex be identified, the AER would reconsider applying an EBSS to capex.

The AER recognises that where the incentive to reduce opex is greater than the incentive to reduce capex, DNSPs may inappropriately favour network augmentation over non-network solutions. For this reason opex relating to non-network solutions are excluded from the operation of the EBSS (see section 5.5 of this final decision).

The AER also notes that not applying the EBSS to capex is consistent with clause 11.16.4 of the NER, which outlines transitional provisions relating to Ergon Energy and Energex

## 5.4 Carryovers and forecast opex

A number of stakeholders raised issues regarding the related issues of the application of negative carryovers and the relationship between carryover amounts and forecast opex during the following regulatory control period.

### 5.4.1 Stakeholder comments

Aurora Energy and Ergon Energy sought clarification as to how the AER will assess DNSPs' opex proposals and questioned whether placing significant weight on the outturn opex in the forecast base year was consistent with clause 6.5.6 of the NER.[12,13]

The ENA, Alinta, United Energy, Citipower, Powercor and ETSA Utilities all noted the important relationship between using outturn opex to determine the opex allowance for the following regulatory control period and carryover amounts. For example, the ENA stated that failure to use the outturn opex amounts in the fourth regulatory year in assessing opex allowance proposals would undermine the efficiency carryover mechanism.[14] Similarly, Alinta urged the AER 'not to disconnect forecasts from year 4 outcomes without the most substantial reasons'.[15] Alinta stated that it considers negative carryovers to be 'less of an issue than preserving the integrity of the EBSS'.[16]

Energex expressed a contrary view and proposed that 'the year 4 opex could be adjusted for any inconsistencies that bias the future opex forecast for the DNSP'.[17]

---

12 Aurora Energy, *AER guidelines, schemes and models*, May 2008, pp. 2–3.

13 Ergon Energy, op. cit., p. 7.

14 ENA, op. cit., p. 3.

15 Alinta, *Guidelines, models and schemes for electricity DNSPs*, May 2008, p. 18.

16 ibid.

17 Energex, *Energex's response to the AER's national guidelines, models and schemes*, May 2008, p. 10.

Citipower and Powercor stated that they did not consider it appropriate to incorporate assumed efficiency gains when determining opex allowances. Doing so would raise the possibility that a DNSP could be penalised, through a negative carryover, despite making efficiency gains if those efficiency gains were not as great as those assumed by the regulator in setting the allowed opex.[18]

CitiPower, Powercor and ETSA Utilities all sought clarification from the AER that it would use jurisdictional arrangements to calculate carryovers for DNSPs currently operating under jurisdictional efficiency carryover schemes.[19, 20]

Ergon Energy sought clarification as to how the EBSS would accommodate obligations placed on DNSPs such as those placed on the Queensland DNSPs by the Electricity Distribution and Service Delivery (EDSD) review which addressed service performance and related maintenance expenditure issues. Ergon Energy expressed concern that applying negative carryovers would penalise the business for complying with the EDSD review.[21]

Energex considered the application of negative carryovers inappropriate and that negative carryovers, which may otherwise lead to inappropriate price volatility for customers, should be offset against future positive carryover amounts.[22] Envestra also considered the application of negative carryovers to be inappropriate and suggested that they should be capped.[23]

### 5.4.2 AER conclusion

When assessing the forecasts proposed by DNSPs against the operating expenditure objectives, the AER will consider all of the operating expenditure criteria and the operating expenditure factors as required by clause 6.5.6 of the NER. In doing so the AER will place significant weight on the actual expenditure in the base year from which forecasts are derived.

The AER notes that it stated in the proposed EBSS that it would place significant weight on the opex in the penultimate regulatory year of the current regulatory control period when assessing opex forecasts for the following regulatory control period. This was because the proposed EBSS, in the final regulatory year adjustment equation, assumed that forecasts were based on actual opex in the penultimate regulatory year of the regulatory control period. However, the AER recognises that in its transmission determinations it has accepted forecast opex based on either the antepenultimate or penultimate years, depending on the timing of the regulatory reset process.

---

18 CitiPower and Powercor, op. cit., p. 3.

19 CitiPower and Powercor, op. cit., p. 4.

20 ETSA Utilities, *Proposed models and schemes: Electricity distribution network service providers: ETSA Utilities submission*, May 2008, p. 3.

21 The review by the Independent Panel appointed by the Queensland Government into Electricity Distribution and Service Delivery for the 21st Century which was established in March 2004 and reported in July 2004.

22 Energex, op. cit., p. 10.

23 Envestra, *Electricity distribution—proposed guidelines, schemes and models*, May 2008, p. 3.

Consequently, the final regulatory year adjustment equation has been amended to enable the EBSS to operate with forecast opex based on either the penultimate or antepenultimate regulatory years of the regulatory control period. The AER notes that regardless of whether antepenultimate or penultimate year actual opex is used as the base year in forecasting opex, penultimate year actual opex is required to calculate carryover amounts.

The AER does not consider placing significant weight on the actual opex in the penultimate year is inconsistent with clause 6.5.6 of the NER. It should be recognised that the AER will not require forecast opex to be set equal to actual opex in the forecast base year. Further, the AER will, in any case, consider all of the operating expenditure objectives, criteria and factors in clause 6.5.6, particularly when assessing variations between opex forecasts and historical opex in the forecast base year to ensure forecast opex is appropriate.

The AER acknowledges the concerns raised by some stakeholders that applying negative carryovers but not basing forecasts on the base year could burden DNSPs with an unfair proportion of efficiency losses. The AER recognises that for the EBSS to provide DNSPs with a constant share of gains and losses, forecasts in the following regulatory control period must align with actual opex in the forecast base year, subject to adjustments for changes in scale and scope.

For these reasons the AER considers it is appropriate that adjustments be made only for demonstrable changes in scale or scope when forecasting opex from the actual opex in the base year. The AER considers this, combined with carryover amounts, provides DNSPs with a reasonable estimate of forecast opex and a fair sharing of any efficiency gains. The AER does not consider this will result in biased opex forecasts for DNSPs.

The AER notes the concerns regarding the incorporation of assumed efficiency gains when determining opex allowances. The AER recognises that by assuming efficiency gains when determining forecast opex would only reward DNSPs for efficiency gains made in excess of the assumed gains. Were a DNSP to make efficiency gains less than those assumed the DNSP would receive negative carryover amounts through the EBSS.

In considering this concern, the AER notes clause 6.5.8(c)(3) of the NER requires it to have regard to the desirability of both rewarding DNSPs for efficiency gains and penalising DNSPs for efficiency losses. Accordingly the AER will be mindful of whether a DNSP is penalised despite making efficiency gains when assessing its opex forecasts in the context of applying the EBSS. The AER also notes that in determining forecast opex for TNSPs the AER has not incorporated assumed efficiency gains.

The AER recognises that efficiency carryover schemes are currently operating in some jurisdictions which some DNSPs are subject to. The AER will calculate and apply the carryovers for these existing schemes in its first revenue determinations for these DNSPs in accordance with the prevailing jurisdictional arrangements in place.

The AER also recognises that some DNSPs will remain subject to certain jurisdictional regulatory requirements. The AER will take these into consideration when assessing DNSPs' opex forecasts and considering the application of the EBSS. For example, the AER recognises that the EDSD review conducted in Queensland found that the DNSPs in that jurisdiction would need to increase maintenance expenditure to lift service performance to appropriate levels. The AER will have

regard to the outcomes of the EDSD review and regulatory implications for Queensland DNSPs when assessing their opex forecast proposals. The AER also notes that its service target performance incentive scheme will provide incentives for DNSPs to maintain and improve service performance.

The AER does not consider that the application of negative carryovers will lead to inappropriate price volatility for consumers. Nor does it consider that, given the symmetric nature of the EBSS, the application of positive carryovers will lead to inappropriate price volatility either. The prices faced by customers are a function of the total revenue requirement determined through the application of the building block approach and the X factor determined by the AER as required under the NER. Increments or decrements arising from the operation of the EBSS are only one of the building blocks that make up the total revenue requirement for a DNSP. The X factor produces a smooth price path for a DNSP whilst ensuring the total revenue is equal to the net present value of the total revenue requirement. Thus the impact of any variation in carryover amounts between regulatory years is addressed by the X factor.

The AER also does not consider it appropriate to cap net negative carryovers. The reasons for this were outlined in the explanatory statement that accompanied the proposed EBSS. The AER considers that a DNSP approaching the cap, if this was in place, would no longer have a continuous incentive to reduce opex. In fact, the DNSP would have an incentive to shift costs to, or even increase costs in, the forecast base year to increase their forecast opex in the following regulatory year without facing the resultant negative carryovers.

## 5.5 Impact on non-network alternatives

In its proposed EBSS, the AER excluded opex relating to non-network alternatives. Few stakeholders addressed this issue in their responses to the AER proposed EBSS.

### 5.5.1 Stakeholder comments

Ergon Energy supported the exclusion from the EBSS of opex relating to non-network alternatives.[24]

### 5.5.2 AER conclusion

The AER maintains the view that excluding opex relating to non-network alternatives from the operation of the EBSS will minimise distortions on incentives to undertake non-network alternatives and is consistent with clause 6.5.8(c)(5) of the NER.

## 5.6 Treatment of distribution losses

In its proposed EBSS the AER decided not to apply the scheme to distribution losses. Those stakeholders who responded to this issue were supportive of the AER approach.

[24] Ergon Energy, op. cit., p. 6.

### 5.6.1 Stakeholder comments

The ENA, Energex and Ergon Energy all supported the AER's decision not to include distribution losses in the proposed EBSS.[25, 26, 27] No other stakeholders commented on the issue of distribution losses.

### 5.6.2 AER conclusion

Given the lack of evidence showing that distribution losses are deviating from efficient levels, the AER considers it appropriate not to apply the EBSS to distribution losses.

## 5.7 Linkages with information requirements

Some stakeholders sought clarification from the AER on the information that will be required from DNSPs under the EBSS. Some stakeholders also questioned whether it would be appropriate to use regulatory information instruments to specify these information requirements.

### 5.7.1 Stakeholder comments

Energex, Ergon Energy and Aurora Energy sought clarification on the information that the AER will require from a DNSP under the EBSS. Aurora Energy sought clarification on the issues the AER will address in its framework and approach paper regarding the application of the EBSS. [28] Aurora Energy and Ergon Energy also requested that the AER clarify the information that will be required of DNSPs in their regulatory proposal. [29, 30] Similarly, Ergon Energy sought to clarify whether there would be any audit requirements for the information required.[31]

Ergon Energy also questioned whether it was appropriate for the AER to use regulatory information instruments to specify the information required for the operation of the EBSS. Ergon Energy considered that it would be more appropriate for all substantive provisions related to the application of an EBSS to a DNSP to be detailed in the scheme. Furthermore, regulatory information instruments, in Ergon Energy's view, should only be used for issues specific to particular businesses.[32]

### 5.7.2 AER conclusion

Clause 6.8.1(b)(2) of the NER requires the AER to set out in its framework and approach paper its likely approach (together with its reasons) to how it intends to apply the EBSS for the purposes of a DNSP's revenue determination.

---

25 ENA, op. cit., p. 4.

26 Energex, op. cit., p. 10.

27 Ergon Energy, op. cit., p. 6.

28 Aurora Energy, op. cit., p.2.

29 ibid.

30 Ergon Energy, op. cit., p. 6.

31 ibid.

32 ibid., pp. 3–4.

Since the EBSS provides for a uniform approach with limited scope for variation in its application, the AER considers that its framework and approach paper for a given DNSP will be limited to stating whether the AER considers it appropriate to apply the EBSS to that DNSP in the forthcoming regulatory control period. The AER notes that the framework and approach papers that will be released for ETSA Utilities, Ergon Energy and Energex will cover the matters the AER will need to address prior to each regulatory reset process.

Appendix D to this final decision summarises the information required from DNSPs in their regulatory proposals for the operation of the EBSS in their forthcoming regulatory control period. In addition to information that would otherwise be required, DNSPs will also be required to provide as part of their regulatory proposals:

- their proposed method for accounting for demand growth to be used at the end of the regulatory control period to adjust forecast opex for outturn demand growth
- a list of any cost categories proposed for exclusions and an explanation as to why they are uncontrollable.

The nature and appropriateness of the proposed method for accounting for actual demand growth will depend on the method used to account for growth in the opex forecasts. Generally the two methods should be the same, with the exception being that one will use actual demand growth and the other forecast demand growth.

Details of the information required from DNSPs in their regulatory proposals will be set out by the AER through regulatory information instruments. The AER considers that regulatory information instruments are appropriate for outlining the information required from DNSPs for the operation of the EBSS. The use of regulatory information instruments will allow the AER to provide DNSPs a single point of reference to understand all of their obligations regarding the reporting of information and the level of assurance/verification required.

The AER notes that s. 28F of the NEL provides that the AER is able to issue a regulatory information instrument when, among other things, 'it considers it reasonably necessary for the performance or exercise of its functions or powers under [the NEL or the NER]'. To this end the AER considers the information that will be required under the regulatory information instruments it issues for the purposes of the EBSS are not only reasonably necessary for the effective operation of the EBSS but will also provide DNSPs with a single reference point to understand all of their obligations and will maintain the transparent nature of the EBSS. These matters are consistent with the AER's functions and powers for the purposes of the EBSS.

The assurance requirements for financial information provided by a DNSP in their regulatory proposal will also be outlined in the regulatory information instruments.

The AER will consult with DNSPs during the preparation of these regulatory information instruments and provide sufficient time to allow DNSPs to comply with any assurance requirements. The AER does not anticipate that the application of the EBSS will significantly alter a DNSP's assurance requirements.

## 5.8 Sharing of efficiency gains

The proposed EBSS shared efficiency gains approximately 30:70 between DNSPs and distribution network users respectively. Some stakeholders considered that it should be amended to provide a greater share to DNSPs approaching the efficiency frontier.

### 5.8.1 Stakeholder comments

Citipower and Powercor argued that a multiplier scheme should be developed to enable different sharing ratios while maintaining a five year regulatory and carryover period. They stated:

> …in the absence of a multiplier scheme the efficient frontier will stagnate to the detriment of the community and industry.[33]

Alinta, United Energy and the ENA suggested that criteria should be developed to assess whether a DNSP is at its efficiency frontier. When a DNSP is approaching this frontier, the sharing ratio should be adjusted to provide sufficient ongoing incentives.[34, 35, 36]

### 5.8.2 AER conclusion

The AER maintains the view, as expressed in its explanatory statement which accompanied the proposed EBSS, that the use of multipliers or a longer carry-over period in the EBSS is inappropriate where the EBSS is only applied to opex. As the AER has determined not to apply the EBSS to capex, increasing the sharing ratio within the EBSS allows a DNSP to retain significantly more of the benefits of opex efficiency gains as compared to capex efficiency gains. The AER considers the resulting imbalance between the strength of capex and opex incentives is potentially detrimental to efficiency as it may inappropriately distort the resource allocation decisions of a DNSP.

For this reason, the AER considers that neither multipliers nor a carry-over period longer than the regulatory control period should be used.

If a DNSP wishes to retain a greater proportion of efficiency gains it would need to propose a longer regulatory control period. The AER will give careful consideration to the sharing ratio when a DNSP proposes a longer regulatory control period, and will consider extending the carryover period to equal the regulatory control period (noting that the carryover period should be the same length or longer than the regulatory control period if the EBSS is to provide a continuous incentive to reduce opex).

---

33 Citipower and Powercor, op. cit., p. 4.

34 Alinta, op. cit., p. 19.

35 United Energy, *Submission to the Australian Energy Regulator: Guidelines, models and schemes for electricity DNSPs*, May 2008, p. 19.

36 ENA, op. cit., p. 3.

In regard to the criteria to assess whether a distributor is at its efficiency frontier, the AER refers to its view expressed in its explanatory statement accompanying the proposed EBSS. This view acknowledged that the assessment of a DNSP's relative efficiency would require the consideration and resolution of a number of firm-specific and industry wide measurement and data issues. These issues would need to be resolved in order for the validity of a DNSP's claim that it was approaching its efficiency frontier to be assessed.

# 6 Consideration of factors set out in the NER

The AER has given consideration to the requirements of chapter 6 of the NER, particularly clause 6.5.8(c), in the development of the EBSS for DNSPs. The AER considers it has addressed each of the requirements in clause 6.5.8(c) it must have regard for the reasons discussed below.

**Clause 6.5.8(c)(1)—the need to ensure that benefits to consumers likely to result from the scheme are sufficient to warrant any reward or penalty under the scheme for DNSPs**

The AER considers that the EBSS will provide greater certainty to DNSPs on how actual opex will be used to assess opex forecast proposals in future regulatory control periods and will provide a continuous incentive to improve efficiency. Consequently the AER considers that the EBSS will consistently encourage efficient and timely expenditure throughout the regulatory control period, which provides an incentive for a DNSP to reveal its efficient opex. This will allow the AER to better determine the efficiency of opex forecasts for future regulatory control periods and, over time, the benefits will be passed on to consumers.

In deciding not to apply the scheme to capex the AER considered the benefits to consumers likely to result from the scheme. Modelling undertaken by the AER demonstrated that when deferred capex is not excluded from capex forecasts it was possible for DNSPs to obtain significant benefits from the scheme despite the total social benefit of a capex deferral being negative. The AER concluded that were the scheme applied to capex the benefits to consumers likely to result from the scheme would not be sufficient (and could in fact be negative) to warrant the reward under the scheme for DNSPs.

The AER accordingly considers the benefit to consumers, in the context of applying an EBSS to opex, is sufficient to warrant the rewards and penalties envisaged to DNSPs in the EBSS.

**Clause 6.5.8(c)(2)—the need to provide DNSPs with a continuous incentive, so far as is consistent with economic efficiency, to reduce operating expenditure and, if the scheme extends to capital expenditure, capital expenditure**

The AER considers continuous incentives are crucial if the EBSS is to encourage DNSPs to reveal their efficient opex. The modelling undertaken by the AER at appendix B to this final decision demonstrates that when a DNSP either 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. Furthermore, the benefit (or penalty) is shared between DNSPs and distribution network users according to the sharing ratio.

Further modelling undertaken by the AER at appendix C to this final decision demonstrates that a cumulative scheme applied to capex would provide a continuous incentive for DNSPs to reduce capex. However, for the scheme to operate effectively, capex deferred from one regulatory control period to another must not be included in a DNSP's capex allowance for the regulatory control period into which the capex is deferred. The AER considers that it is not practicable to exclude from a DNSP's capex allowance any capex that has been deferred from a previous regulatory control period. If deferred capex is not excluded from subsequent capex allowances under an

EBSS applied to capex, such a scheme would not provide a DNSP with a continuous incentive to reduce capex. Under such a scheme, DNSPs would also have an incentive to defer capex to the next period even when it is not efficient to do so.

The AER accordingly considers the provision of a continuous incentive to reduce opex through the EBSS is consistent with economic efficiency. This is not the case with capex in the context of the EBSS.

**Clause 6.5.8(c)(3)—the desirability of both rewarding DNSPs for efficiency gains and penalising DNSPs for efficiency losses**

The AER has examined the appropriateness of applying negative carryovers. Modelling undertaken of the EBSS highlights that the application of both positive and negative carryovers is necessary for the scheme is to provide a constant incentive to improve efficiency.

Furthermore, without the application of both negative and positive carryover amounts, DNSPs would have a significant incentive to shift opex into the base year of the regulatory control period in order to increase its forecasts for the following regulatory control period. It follows that in the absence of applying both positive and negative carryovers, the EBSS would not in practice provide a DNSP with the incentive to reveal its efficient costs.

The AER accordingly considers it desirable to apply both positive and negative carryovers that reward and penalise DNSPs for efficiency gains and losses incurred respectively.

**Clause 6.5.8(c)(4)—any incentives that DNSPs may have to capitalise expenditure**

An important outcome of the EBSS is that it provides a continuous incentive to improve the efficiency of opex throughout the regulatory control period. In only applying the EBSS to opex, a DNSP may have the incentive to shift opex to capex, particularly later in the regulatory control period.

The AER recognises this potential incentive and will require DNSPs to advise the AER of any changes to its capitalisation policy. To address any incentive to inappropriately capitalise opex, the AER will adjust the forecast and actual opex figures used to calculate the carryover amounts to account for any changes in capitalisation policy.

**Clause 6.5.8(c)(5)—the possible effects of the scheme on incentives for the implementation of non-network alternatives**

The AER considers that the EBSS will not distort the incentives for DNSPs to undertake non-network alternatives because any associated opex will be excluded from the EBSS.

Because the EBSS is not applied to capex, the incentive later in the regulatory control period to reduce capex is less than the incentive to reduce opex. Consequently, where expenditure for non-network alternatives is operational in nature, DNSPs may have a greater incentive later in the regulatory control period to augment networks rather than implement non-network alternatives. By excluding opex for non-network alternatives from the EBSS, the AER considers the impact on the incentive to augment networks rather than implement non-network alternatives will be neutral.

# 7 AER decision

On the basis of the submissions received, and consideration of the issues raised, the AER has made some minor amendments to the proposed EBSS released on 1 April 2007. These amendments are reflected in the EBSS at appendix E of this final decision.

Recognising concerns raised regarding changes in service classification, the AER has sought to clarify how the EBSS will operate when there has been a change in service classification between regulatory control periods. When a service is not classified as a standard control service in the following regulatory control period, the AER may remove the opex relating to that service from the actual and forecast opex figures used to calculate carryover amounts. In determining whether to do so, the AER will consider such factors as the materiality of the impact on carryover amounts and the associated potential for, and magnitude of, cross-subsidies, and whether there is any evidence of the DNSP inappropriately shifting costs to maximise carryover payments.

The AER has also amended the final regulatory year adjustment equation in the EBSS to operate with forecast opex based on either the penultimate or antepenultimate regulatory year of the regulatory control period. This ensures that the EBSS will provide continuous incentives to reduce opex when opex forecasts are based on either of these regulatory years.

# Appendix A: Submissions received

The following interested parties provided submissions on the AER's proposed EBSS that was released on 1 April 2007:

- Alinta
- United Energy Distribution
- Aurora Energy
- CitiPower and Powercor Australia
- Energy Networks Association
- Energex
- Envestra
- Ergon Energy
- ETSA Utilities
- Independent Competition and Regulatory Commission
- SPA Consulting Engineers

Copies of these submissions are available on the AER's website at www.aer.gov.au.

# Appendix B: Opex EBSS modelling

## B.1 NPV analysis of the opex EBSS

This appendix provides a NPV analysis of a number of different scenarios and illustrates the incentives provided by the EBSS. It includes analysis of the:

- incentives to make ongoing efficiency gains
- incentives to make one-off efficiency gains
- incentives to bring forward or delay opex
- impact of a declining/rising opex profile
- impact of actual opex exceeding forecast
- incentives to shift costs into the forecast base year
- setting of forecasts based on average actual costs

The analysis illustrates the nature of the incentives provided by the EBSS. Table B.1 summarises the impact of the EBSS on a DNSP that makes: an ongoing change to opex; a one off change to opex, and; brings forward or delays opex.

**Table B.1 Summary of incentives provided by the EBSS**

| Change | Without an EBSS | With an EBSS |
|---|---|---|
| Ongoing change to opex | The DNSP retains the benefit or funds the expense of the change until the next determination when it is 'clawed back'. The incentive decreases as the period progresses as benefits/expenses are not retained for as long. | The DNSP retains the benefit or funds the expense of the change for five years after the change is made. After five years, the change is passed on to consumers, sharing the change 30:70 between DNSPs and users. |
| One off change to opex | The DNSP retains the full benefit or funds the full expense. If forecasts are based on a single year, the DNSP benefits from opex increases in that year. | The DNSP has to refund an opex reduction and is reimbursed an opex increase six years after the opex change occurs. Due to the time value of money, this shares the change 30:70 between the DNSP and users. |
| Change in timing of opex | The DNSP retains the full time value of money benefit of opex deferrals and faces the full time value of money cost of bringing opex forward. If forecasts are based on a single year, a DNSP benefits from shifting opex into that year. | The time value of money benefits or costs of the timing change are shared 30:70 between DNSPs and users. The DNSP does not benefit from shifting opex into the forecast base year for the next regulatory control period. |

## B.2 Incentives to make ongoing efficiency gains

Consider a DNSP with annual (real) opex of $100 million. The DNSP operates under constant scale and scope (for example, demand is constant over the period and the DNSP's regulatory responsibilities do not change). The DNSP has the opportunity to make a $10 million ongoing reduction to opex. If that reduction is initiated in the first year of the regulatory control period, the NPV to the DNSP of making the $10 million ongoing reduction will be $52.1 million (assuming a real discount rate of 6 per cent). The majority of this benefit will be derived from opex underspends during the current period. In addition, the DNSP will receive a $10 million carryover payment in the first year of the next period (see table B.2).

As demonstrated in tables B.2 through B.4, the DNSP will receive the same benefit ($52.1 million in NPV terms) regardless of the year in the regulatory control period in which the ongoing opex reduction is identified.[37] However, the benefit derived from carryover payments increases as the period progresses. This is because the benefit the DNSP receives from opex underspends during the current period decreases as the period progresses. Thus, while the magnitude of carryover amounts increases as the period progresses, the combined impact of current period underspends, future carryover payments and future period forecast changes, measured in NPV terms, does not change. Thus, the incentive to make the ongoing reduction to opex is the same in each year of the regulatory control period.

Of note, the total NPV of the ongoing $10 million opex reduction is $177 million (assuming a 6 per cent real discount rate). Thus, the benefit to DNSPs ($52.1 million) represents 30 per cent of the total benefit and the scheme yields a 30:70 sharing ratio between DNSPs and distribution network users, respectively.

Table B.5 demonstrates the impact of an opex increase and highlights the symmetry of the EBSS. As shown, the EBSS serves to carry over opex increases in an identical fashion to opex reductions. Thus, a $10 million ongoing increase in year one (or any other year) costs a DNSP $52.1 million in NPV terms.

**Table B.2: Impact of an ongoing opex reduction initiated in regulatory year 1 ($million, regulatory year 1 dollars)**

| *Year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 |
| Actual (A) | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Incremental saving (E) | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 10 | 10 | 10 | 10 | 10 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 10 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | 52.1 |

[37] It has been assumed that the efficiency gain is initiated in the regulatory year in which it is identified. To apply this assumption, the discount factor has been equated to 1 in the regulatory year in which the opportunity is identified.

**Table B.3: Impact of an ongoing opex reduction initiated in regulatory year 4 ($million, regulatory year 1 dollars)**

| *Year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 |
| Actual (A) | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Incremental saving (E) | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 10 | 10 | 10 | 10 | 10 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 10 | 10 | 10 | 10 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 |
| Net present value | | | | | | | | | | 52.1 |

**Table B.4: Impact of an ongoing opex reduction initiated in year 5 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 90 |
| Incremental saving (E) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Discount factor | 1.26 | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 |
| Net present value | | | | | | | | | | 52.1 |

**Table B.5: Impact of an ongoing opex increase initiated in year 1 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 110 | 110 |
| Actual (A) | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| Incremental saving (E) | -10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | -10 | -10 | -10 | -10 | -10 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | -10 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 110 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | -52.1 |

## B.3 Incentives to make one-off efficiency gains

When considering the incentives for opex reduction delivered by the EBSS, consideration should be given to one-off opex savings in addition to ongoing savings. Consider now a DNSP that has the opportunity to reduce opex by $10 million in the first year of the regulatory control period. Again assuming a real discount rate of 6 per cent, the NPV to the DNSP of making the one-off opex reduction will be $3.0 million (see table B.6). This benefit is comprised of the $10 million underspend in the current period and a negative carryover of $10 million six years later, worth $7.0 million in NPV terms.[38]

Should the same opportunity arise in any other year of the regulatory control period the NPV of the opex reduction would also be $3.0 million in the year of the opex reduction (see tables B.6 through B.8). This is because a one-off opex reduction has the impact of reducing by the same amount the effective opex forecast (that is, the forecast plus any EBSS carryover amounts for that year) in the sixth year after the opex reduction. Note the impact of a $10 million opex reduction in year 4 of table B.7. This will result in positive carryover amounts of $10 million in each of the first four years of the next period. However, it also results in a reduction in forecasts of $10 million in each year of the next period. Subsequently, the NPV of a $10 million one-off opex reduction, and thus the incentive to make any such reduction, is the same as if the reduction occurred in any other year.

The symmetry of the EBSS is demonstrated in table B.9 which shows that a one-off increase in year one has the opposite impact to a one-off decrease.

**Table B.6: Impact of a one-off opex reduction in year 1 ($million, year 1 dollars)**

| *Year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | 10 | -10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 10 | 10 | 10 | 10 | 10 | | | | |
| 2 | | | -10 | -10 | -10 | -10 | -10 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0 | -10 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 100 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | 3.0 |

[38] A negative carry-over amount resulting from a one-off opex reduction may appear counter–intuitive, since the EBSS is designed to provide incentives to DNSPs to reduce costs. However, the EBSS is also designed to provide a fair sharing of efficiency gains and losses between DNSPs and distribution network users. In the absence of an EBSS, a one-off opex reduction in regulatory year one, if it had no impact on opex forecasts in the next period, would be retained in its entirety by a DNSP and not shared with distribution network users.

**Table B.7: Impact of a one-off opex reduction in regulatory year 4 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 |
| Actual (A) | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 10 | 10 | 10 | 10 | 10 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 10 | 10 | 10 | 10 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 |
| Net present value | | | | | | | | | | 3.0 |

**Table B.8: Impact of a one-off opex reduction in regulatory year 5 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | 0 | 0 | 0 | 0 | 0 | -10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | 0 |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | | | | | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | -10 | -10 | -10 | -10 | -10 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0 | 0 | 0 | 0 | 0 | -10 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 |
| Discount factor | 1.26 | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 |
| Net present value | | | | | | | | | | | | | | | 3.0 |

**Table B.9: Impact of a one-off opex increase in regulatory year 1 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 110 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | -10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | -10 | -10 | -10 | -10 | -10 | | | | |
| 2 | | | 10 | 10 | 10 | 10 | 10 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0 | 10 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 100 | 100 | 100 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | -3.0 |

## B.4 Incentives to bring forward or delay opex

It is also worth considering the incentives to bring forward or delay opex. Intuitively, one might think that a DNSP could benefit from bringing costs forward as this will yield incremental cost reductions in the following regulatory years and positive carryover payments. However, this is not the case. While a DNSP can maximise its carryover payments by bringing forward opex, it will not benefit from doing so. Remember, the opex incentive is derived from a combination of benefits from underspending in the current period, carryover payments and impacts on future forecast amounts.

The bringing forward of opex is essentially a one-off opex increase in one regulatory year followed by a one-off opex decrease, of the same value in real terms, in a later regulatory year. As shown above, the benefit (cost) to a DNSP of a one-off opex decrease (increase) is the same in each regulatory year of the regulatory control period. Thus, a DNSP will never benefit from bringing opex forward due to the time value of money (assuming the magnitude of the opex remains constant in real terms).

Consequently, a DNSP will always benefit from delaying opex, where this is possible (assuming the delaying of opex imposes no other costs). The EBSS serves to share the time value of money benefits (costs) from delaying (bringing forward) opex between DNSPs and distribution network users. If a DNSP delays any costs, it will receive 30 per cent of the time value of money benefits, assuming a 30:70 sharing ratio (the ratio resulting from a five regulatory year carryover period and a 6 per cent real discount rate).

Since the incentive to delay costs is constant, delaying opex that is forecast for the forecast base year will not result in the delayed opex being inappropriately embedded in opex forecasts for the next period. As demonstrated in table B.10, a DNSP that delays regulatory year 4 opex will have their forecasts reduced by the same amount in each regulatory year of the next regulatory control period when forecasts are based on regulatory year four outturn opex. However, they will also receive positive carryover payments that ensure that the time value of money benefits from the delayed opex are shared between the DNSP and distribution network users.

**Table B.10: Impact of deferring regulatory year 4 opex ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 100 | 100 | 100 | 90 | 110 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | 0 | 0 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | | | | | | |
| 4 | | | | | 10 | 10 | 10 | 10 | 10 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | 10 | 10 | 10 | 10 | 10 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 10 | 10 | 10 | 10 | 0 | 10 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 110 | 100 | 100 | 100 | 100 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1.00 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 | 0.53 |
| Net present value | | | | | | | | | | | | | | | 0.17 |

## B.5 Impact of a declining/rising opex profile

During consultation, the impact of declining (and rising) opex profiles was raised. Particularly, stakeholders questioned whether a DNSP should benefit (or be penalised) where its total actual opex is as forecast but its opex declines (rises) over the regulatory control period. Consider a DNSP who has forecast opex of $100 million in real terms in each regulatory year of the next regulatory control period. It has the opportunity to bring forward some of those costs such that its opex will decline by $10 million each regulatory year from $120 million in the first regulatory year to $80 million in the fifth regulatory year. For the initial period, the present value of the overspends in regulatory years 1 and 2 is greater than the present value of the underspend in regulatory years 4 and 5 due to the time value of money. As demonstrated in table B.11, the EBSS operates by setting the opex in the next period in accordance with the regulatory year four outturn and there are positive and negative carryovers from the first period. Under such a scenario, the DNSP is worse of by $1.5 million in NPV terms. The $1.5 million represents 30 per cent of the time value of money costs of bringing opex forward, the total of which are shared between DNSPs and distribution network users according to the sharing ratio (30:70 in this instance). Thus when a DNSPs outturn opex exhibits a declining/rising profile the time value of money costs/benefits of this profile are distributed between the DNSP and consumers according to the sharing ratio.

**Table B.11: Impact of bringing opex forward ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 120 | 110 | 100 | 90 | 80 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | -20 | 10 | 10 | 10 | 0 | -20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | | | | | | |
| 1 | | -20 | -20 | -20 | -20 | -20 | | | | | | | | | |
| 2 | | | 10 | 10 | 10 | 10 | 10 | | | | | | | | |
| 3 | | | | 10 | 10 | 10 | 10 | 10 | | | | | | | |
| 4 | | | | | 10 | 10 | 10 | 10 | 10 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | -20 | -20 | -20 | -20 | -20 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 10 | 30 | 20 | 10 | 0 | -20 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 120 | 110 | 100 | 90 | 80 | 100 | 100 | 100 | 100 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 | 0.53 | 0.50 | 0.47 | 0.44 |
| Net present value | | | | | | | | | | | | | | | -1.5 |

## B.6 Impact of actual opex exceeding forecast

During consultation, stakeholders raised concerns regarding the impact of 'incorrect forecasts' on the operation of the EBSS. (In subsequent periods, the EBSS sets the opex forecast on the basis of actual expenses incurred in the forecast base year of the previous regulatory control period. As demonstrated later, the scheme removes the incentive to shift costs to the forecast base year.) Consider first the case where a DNSP's forecasts are lower than its actual efficient costs by $10 million in each regulatory year of the regulatory control period. As demonstrated in table B.12, if there were no ex post adjustments of forecasts, the impact of the incorrect forecast on the DNSP is the same as an ongoing efficiency loss of the same amount initiated in the first year.

**Table B.12: Impact of a $10 million under forecast in each regulatory year of the first regulatory control period ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 110 | 110 |
| Actual (A) | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 | 110 |
| Incremental saving (E) | -10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | -10 | -10 | -10 | -10 | -10 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | -10 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 110 | 110 | 110 | 110 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | -52.1 |

Thus, the DNSP would be worse off by $52 million in NPV terms due to the incorrect forecasts in this circumstance. Of the $52 million, $44.7 million would be from overspending within the regulatory control period and $7.5 million from negative carryover amounts. Thus, an EBSS without ex post adjustments of forecasts would magnify the impact on the DNSP of the incorrect forecast by 17 per cent (this value will vary slightly with a different discount rate).

Consider also the case where the forecast growth in opex has been underestimated. Assume, for instance, that efficient actual opex grows, in real terms, by $2 million a year more than forecast opex due to higher than expected demand growth. As demonstrated in table B.13, such a scenario magnifies the impact of overspends on a DNSP to a greater extent than the previous example.

**Table B.13: Impact of forecast opex growth being $2 million per annum less than the efficient amount in each regulatory year of the first regulatory control period ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 112 | 114 | 116 | 118 | 120 | 122 | 124 | 126 | 128 | 130 |
| Actual (A) | 102 | 104 | 106 | 108 | 110 | 112 | 114 | 116 | 118 | 120 | 122 | 124 | 126 | 128 | 130 |
| Incremental saving (E) | -2 | -2 | -2 | -2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | | | | | | |
| 1 | | -2 | -2 | -2 | -2 | -2 | | | | | | | | | |
| 2 | | | -2 | -2 | -2 | -2 | -2 | | | | | | | | |
| 3 | | | | -2 | -2 | -2 | -2 | -2 | | | | | | | |
| 4 | | | | | -2 | -2 | -2 | -2 | -2 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | 2 | 2 | 2 | 2 | 2 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | -8 | -6 | -4 | -2 | 0 | 2 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 104 | 108 | 112 | 116 | 120 | 124 | 124 | 126 | 128 | 130 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 | 0.53 | 0.50 | 0.47 | 0.44 |
| Discounted net carryover | 0 | 0 | 0 | 0 | 0 | -6.0 | -10.2 | -12.9 | -14.1 | -14.1 | -13.0 | -13.0 | -13.0 | -13.0 | -13.0 |
| Discounted net underspend | -2 | -5.8 | -11.1 | -17.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 | -25.8 |
| Net present value | | | | | | | | | | | | | | | -38.8 |

In the example, forecast opex has been set to $112 million in regulatory year six to account for the revealed efficient opex in regulatory year four and observed demand growth. That is, when the forecasts are set for the second period, the $108 million in regulatory year four is adjusted for demand growth, which increases efficient opex by $2 million each year.

The DNSP described in table B.13 would be worse off by $39 million in NPV terms due to actual demand growth exceeding forecast demand growth in the first period. Of the $39 million, $26 million is from overspending within the regulatory control period and $13 million is from negative carryover amounts. Thus, we can see that an EBSS without ex post adjustment of forecasts would magnify the impact on the DNSP of the incorrect forecasts by 51 per cent. With ex post adjustment of forecasts, actual demand growth would be adjusted for and there would be no negative carryovers.

## B.7 Incentives to shift costs into the forecast base year

Consider a DNSP with forecast real annual opex of $100 million and the ability to delay or bring forward opex by up to 12 months. If forecasts in the next regulatory period were based on actual opex in regulatory year 4, and the DNSP sought to maximise its forecasts in the next regulatory control period it would delay all regulatory year three opex until regulatory year four and bring all regulatory year 5 opex into regulatory year 4, as demonstrated in table B.14 below. Such an opex profile would yield forecast opex of $300 million in the next period. However, such an opex profile would also result in total carryover amounts of negative $1000 million. The NPV of such an opex profile would be $0.1 million.[39] By comparison, if a DNSP exhibited the same opex profile without an EBSS it would generate benefits of some $668 million in NPV terms by moving regulatory years three and five opex into regulatory year 4 (see table B.15).

**Table B.14: Impact of shifting opex into the forecast base year with an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 300 | 300 | 300 | 300 | 300 | 100 | 100 | 100 | 100 | 100 |
| Actual (A) | 100 | 100 | 0 | 300 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Incremental saving (E) | 0 | 0 | 100 | -300 | 0 | -100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carryover of gains made in | | | | | | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 3 | | | | 100 | 100 | 100 | 100 | 100 | | | | | | | |
| 4 | | | | | -300 | -300 | -300 | -300 | -300 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | -100 | -100 | -100 | -100 | -100 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | -200 | -200 | -200 | -300 | 0 | -100 | 0 | 0 | 0 | 0 |
| Effective target | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0 | 300 | 0 | 100 | 100 | 100 | 100 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 | 0.53 | 0.50 | 0.47 | 0.44 |
| Net present value | | | | | | | | | | | | | | | 0.1 |

[39] It is worth noting that this amount is 30 per cent of the NPV of the same cost profile for a DNSP where there is no EBSS and forecasts are based on efficient costs. As demonstrated in B.3, the time value of money benefits/costs from bringing forward or delaying opex are shared 30:70 between DNSPs and distribution network users (assuming a real discount rate of 6 per cent).

**Table B.15: Impact of shifting opex into the forecast base year without an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 300 | 300 | 300 | 300 | 300 |
| Actual (A) | 100 | 100 | 0 | 300 | 0 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 0 | 0 | 100 | -200 | 100 | 200 | 200 | 200 | 200 | 200 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | 668 |

## B.8 Setting of forecasts based on average actual costs

Another method for setting forecasts is to base forecast opex on an average of the most recent five regulatory years of actual opex. In tables B.16 through B.20 forecasts for the next regulatory control period are based on a weighted average of years zero to four, which are assumed to be the five most recent years of actual opex available at the determination. These tables show that basing forecasts on a weighted average of five regulatory years of actual data provides a constant incentive to reduce opex, without an EBSS. Furthermore, comparing tables B.16 to B.20 to tables B.2 to B.5 shows that weighted average forecasts provide the same incentive as the EBSS, that is the NPV of an ongoing opex reduction is the same.

In setting the forecasts for years six to ten, the actual opex for regulatory years 0–4 have been weighted to account for the time value of money using the following weightings:

$$\text{Forecast opex} = \frac{c_0 A_0 + c_1 A_1 + c_2 A_2 + c_3 A_3 + c_4 A_4}{5}$$

where: $$c_n = \frac{5 \times WACC(1+WACC)^{4-n}}{(1+WACC)^5 - 1}$$

**Table B.16: Impact of an ongoing opex reduction initiated in regulatory year 1 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 92.2 | 92. | 92.2 | 92.2 | 92.2 |
| Actual (A) | 100 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Cumulative saving (F – A) | 0 | 10 | 10 | 10 | 10 | 10 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| Discount factor | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | | 52.1 |

**Table B.17: Impact of an ongoing opex reduction initiated in regulatory year 2 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 94.4 | 94.4 | 94.4 | 94.4 | 94.4 |
| Actual (A) | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Cumulative saving (F – A) | 0 | 0 | 10 | 10 | 10 | 10 | 4.35 | 4.35 | 4.35 | 4.35 | 4.35 |
| Discount factor | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 |
| Net present value | | | | | | | | | | | 52.1 |

**Table B.18: Impact of an ongoing opex reduction initiated in regulatory year 3 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 96.3 | 96.3 | 96.3 | 96.3 | 96.3 |
| Actual (A) | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Cumulative saving (F – A) | 0 | 0 | 0 | 10 | 10 | 10 | 6.35 | 6.35 | 6.35 | 6.35 | 6.35 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 |
| Net present value | | | | | | | | | | | 52.1 |

**Table B.19: Impact of an ongoing opex reduction initiated in regulatory year 4 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 |
| Actual (A) | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Cumulative saving (F – A) | 0 | 0 | 0 | 0 | 10 | 10 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 |
| Discount factor | 1.26 | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 |
| Net present value | | | | | | | | | | | 52.1 |

**Table B.20: Impact of an ongoing opex reduction initiated in regulatory year 5 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 90 | 90 | 90 | 90 | 90 |
| Actual (A) | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 90 |
| Cumulative saving (F – A) | 10 | 10 | 10 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 |
| Net present value | | | | | | | | | | | 52.1 |

Similarly tables B.21 through B.25 show that in using weighted average forecasts, the incentives to make one-off opex reductions are equal in each regulatory year of the regulatory control period. Like ongoing opex reductions, the NPV of a one-off opex reduction is the same when forecasts are based on a weighted average of actual opex as using an EBSS with forecasts based on regulatory year 4 actual opex (see tables B.6 through B.8).

**Table B.21: Impact of a one-off opex reduction in regulatory year 1 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 97.9 | 97.9 | 97.9 | 97.9 | 97.9 |
| Actual (A) | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 0 | 10 | 0 | 0 | 0 | 0 | -2.1 | -2.1 | -2.1 | -2.1 | -2.1 |
| Discount factor | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| Net present value | | | | | | | | | | | 3.0 |

**Table B.22: Impact of a one-off opex reduction in regulatory year 2 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 98.0 | 98.0 | 98.0 | 98.0 | 98.0 |
| Actual (A) | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 0 | 0 | 10 | 0 | 0 | 0 | -2.0 | -2.0 | -2.0 | -2.0 | -2.0 |
| Discount factor | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 |
| Net present value | | | | | | | | | | | 3.0 |

**Table B.23: Impact of a one-off opex reduction in regulatory year 3 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 98.1 | 98.1 | 98.1 | 98.1 | 98.1 |
| Actual (A) | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 0 | 0 | 0 | 10 | 0 | 0 | -1.9 | -1.9 | -1.9 | -1.9 | -1.9 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 |
| Net present value | | | | | | | | | | | 3.0 |

**Table B.24: Impact of a one-off opex reduction in regulatory year 4 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *0* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 |
| Actual (A) | 100 | 100 | 100 | 100 | 90 | 100 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 0 | 0 | 0 | 0 | 10 | 0 | -1.8 | -1.8 | -1.8 | -1.8 | -1.8 |
| Discount factor | 1.26 | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 |
| Net present value | | | | | | | | | | | 3.0 |

**Table B.25: Impact of a one-off opex reduction in regulatory year 5 with weighted average forecasts ($million, regulatory year 1 dollars)**

| *Regulatory year* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | 100 | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 |
| Actual (A) | 90 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Cumulative saving (F – A) | 10 | 0 | 0 | 0 | 0 | 0 | -2.2 | -2.2 | -2.2 | -2.2 | -2.2 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 | 0.56 |
| Net present value | | | | | | | | | | | 3.0 |

# Appendix C: Capex EBSS modelling

## C.1 NPV analysis of the capex EBSS

This appendix provides a NPV analysis of a number of different scenarios and illustrates the incentives provided by a capex EBSS. It includes analysis of the incentives to make one-off efficiency gains and the incentives to delay capex.

The analysis illustrates the nature of the incentives provided by a capex EBSS. Table C.1 summarises the impact of a capex EBSS on a DNSP that reduces or delays capex.

**Table C.1 Summary of incentives provided by a capex EBSS**

| Change | Without an EBSS | With an EBSS |
|---|---|---|
| Reduction in capex | The DNSP receives a return on the unspent forecast capex in each regulatory year remaining in the regulatory control period. | The DNSP receives a return on the unspent forecast capex for five regulatory years after the regulatory year in which actual capex varied from forecast capex. Due to the time value of money this distributes the impact of the change 30:70 between the DNSP and users. |
| Change in timing of capex within a regulatory control period | The DNSP retains the full time value of money benefit of capex deferrals and faces the full time value of money cost of bringing capex forward. | The time value of money benefits or costs of the timing change are shared 30:70 between DNSPs and users. |
| Deferral of capex to a later regulatory control period | The DNSP retains as much as all of the time value of money benefits of the deferral. The proportion of benefits retained by the DNSP decreases the longer the capex is deferred. | The time value of money benefits of the deferral are shared 30:70 between DNSPs and users. |

## C.2 Incentives to make capex efficiency gains

Consider a DNSP that has the opportunity to reduce capex by $10 million for a given capital project in the first year of the regulatory control period. Assuming a real discount rate of 6 per cent, the NPV of making the capex reduction will be $3.13 million to the DNSP (see table C.2). In the current period, the DNSP receives the benefit of not having to fund the unspent forecast capex. In this example the DNSP would be $0.6 million better off in each regulatory year of the first period (the capex reduction multiplied by the WACC). In the following regulatory control period the DNSP would receive carryover amounts through the EBSS. In this example the DNSP would receive $0.6 million in the first regulatory year of the second regulatory control period. The incentive to reduce capex will also depend on whether actual or forecast depreciation is used in the RFM. In this example it has been assumed that forecast depreciation is used in the RFM. (If actual depreciation were used the DNSP would also retain the difference between forecast and actual depreciation.) The net impact of these is that the DNSP is $3.1 million better off. This represents 30 per cent

of the total benefit of $10.6 million (the NPV of $10 million not being expended and rolled into the RAB).

Should the same opportunity arise in any other regulatory year of the regulatory control period the NPV of the capex reduction would also be $3.1 million in the year of the reduction (see tables C.2 and C.3).

The symmetry of the EBSS is demonstrated in table C.4, which demonstrates that the impact of a capex efficiency loss in regulatory year 1 has the opposite impact to an efficiency gain.

**Table C.2: Impact of a capex reduction in regulatory year 1 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | | | | | |
| Actual (A) | 90 | 100 | 100 | 100 | 100 | | | | | |
| Cumulative saving (F – A) | 10 | 0 | 0 | 0 | 0 | | | | | |
| Efficiency gain (E) | 0.6 | 0 | 0 | 0 | 0 | | | | | |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0.6 | 0 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| DNSP benefit | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 0.6 | 0.57 | 0.53 | 0.50 | 0.48 | 0.45 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 3.13 |

**Table C.3: Impact of a capex reduction in regulatory year 4 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | | | | | |
| Actual (A) | 100 | 100 | 100 | 90 | 100 | | | | | |
| Cumulative saving (F – A) | 0 | 0 | 0 | 10 | 0 | | | | | |
| Efficiency gain (E) | 0 | 0 | 0 | 0.6 | 0 | | | | | |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carryover amount | | | | | | 0.6 | 0.6 | 0.6 | 0.6 | 0 |
| Discount factor | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 |
| DNSP benefit | 0 | 0 | 0 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0 |
| PV DNSP benefit | 0 | 0 | 0 | 0.6 | 0.57 | 0.53 | 0.50 | 0.48 | 0.45 | 0 |
| NPV DNSP benefit | | | | | | | | | | 3.13 |

**Table C.4: Impact of a capex increase in regulatory year 1 ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | | | | | |
| Actual (A) | 110 | 100 | 100 | 100 | 100 | | | | | |
| Cumulative saving (F – A) | -10 | 0 | 0 | 0 | 0 | | | | | |
| Efficiency gain (E) | -0.6 | 0 | 0 | 0 | 0 | | | | | |
| Carryover of gains made in | | | | | | | | | | |
| 1 | | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carry-over amount | | | | | | -0.6 | 0 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| DNSP benefit | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | -0.6 | -0.57 | -0.53 | -0.50 | -0.48 | -0.45 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | -3.13 |

## C.4 Incentives to defer capex

It is also important to consider the incentives to defer capex, both within a regulatory control period and between periods. In the absence of an EBSS DNSPs retain all of the time value of money benefits of deferring capex within a regulatory control period. If forecast depreciation is used in the RFM the amount of capex rolled into the RAB depends only on the total amount of capex spent during the regulatory control period. The timing of the expenditure does not impact the roll forward of the RAB. Thus, when forecast depreciation is used in the RFM, the benefit to a DNSP of deferring capex within a regulatory control period is equal to the time value of money benefit of the deferral. When actual depreciation is used in the RFM the amount of capex rolled forward will depend on the timing of the expenditure to the extent it changes the amount of actual depreciation. Consequently DNSPs retain the time value of money benefits of delaying capex plus any difference between forecast and actual depreciation.

Table C.5 illustrates the example of regulatory year 1 capex being deferred to regulatory year 2. It assumes forecast depreciation is used in the RFM. It illustrates how a capex EBSS would share with consumers $4.2 million, or 70 per cent, of the total $6.0 million in time value of money benefits of capex deferral.

**Table C.5: Impact of deferring year 1 capex by one regulatory year ($million, regulatory year 1 dollars) with an EBSS**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 100 | 100 | 100 | 100 | | | | | |
| Actual (A) | 0 | 200 | 100 | 100 | 100 | | | | | |
| Cumulative saving (F – A) | 100 | -100 | 0 | 0 | 0 | | | | | |
| Efficiency gain (E) | 6 | -6 | 0 | 0 | 0 | | | | | |
| Carry-over of gains made in | | | | | | | | | | |
| 1 | | 6 | 6 | 6 | 6 | 6 | | | | |
| 2 | | | -6 | -6 | -6 | -6 | -6 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carry-over amount | | | | | | 0 | -6 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| DNSP benefit | 6 | 0 | 0 | 0 | 0 | 0 | -6 | 0 | 0 | 0 |
| PV DNSP benefit | 6 | 0 | 0 | 0 | 0 | 0 | -4.2 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 1.8 |

The incentive to defer capex to a later period will depend on the year in which it was forecast to be spent, and the regulatory year to which it is deferred. Without an EBSS, a DNSP can retain up to 100 per cent of the benefit of deferring capex to a later regulatory control period. Table C.6 demonstrates the case of deferring capex forecast to be spent in the first regulatory year of a regulatory control period to the first regulatory year of the next regulatory control period.

**Table C.6: Impact of deferring year 1 capex to the first regulatory year of the next regulatory control period without an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Cumulative saving (F – A) | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| DNSP benefit | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 6 | 5.7 | 5.3 | 5.0 | 4.8 | 0 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 26.8 |
| PV benefit to consumers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NPV benefit to customers | | | | | | | | | | 0 |
| PV total benefit | 106 | 0 | 0 | 0 | 0 | -79.2 | 0 | 0 | 0 | 0 |
| NPV total benefit | | | | | | | | | | 26.8 |

Whenever capex is deferred to the first regulatory year of the next regulatory control period the DNSP retains 100 per cent of the time value of money benefits of that deferral. Table C.7 demonstrates the case where capex forecast to be spent in the third regulatory year of a regulatory control period is deferred to the first regulatory year of the next regulatory control period.

**Table C.7: Impact of deferring regulatory year 3 capex to the first regulatory year of the next regulatory control period without an EBSS ($million, y regulatory ear 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 0 | 0 | 100 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Cumulative saving (F – A) | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Discount factor | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 |
| DNSP benefit | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 0 | 0 | 6 | 5.7 | 5.3 | 0 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 17.0 |
| PV benefit to consumers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NPV benefit to customers | | | | | | | | | | 0 |
| PV total benefit | 0 | 0 | 106 | 0 | 0 | -89 | 0 | 0 | 0 | 0 |
| NPV total benefit | | | | | | | | | | 17.0 |

Where capex is deferred to a regulatory year later than the first regulatory year of the next regulatory control period, the DNSP retains the same benefit as if they had deferred the capex to the first year. Thus the DNSP receives less than 100 per cent of the time value of money benefit of the deferral and the proportion of benefits received declines the longer the deferral. Table C.8 demonstrates the case where capex forecast to be spent in the third regulatory year of a regulatory control period is deferred to the fourth regulatory year of the next regulatory control period. In this example the DNSP retains $17.0 million of the time value of money benefits of the deferral. This is the same benefit as received in the example in table C.7. However, the total benefit has now increased to $31.3 million and thus the DNSP has received 54 per cent of the total time value of money benefit.

**Table C.8: Impact of deferring regulatory year 3 capex to regulatory year 4 of the next regulatory control period without an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| Cumulative saving (F – A) | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Discount factor | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 |
| DNSP benefit | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 0 | 0 | 6 | 5.7 | 5.3 | 0 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 17.0 |
| PV benefit to consumers | 0 | 0 | 0 | 0 | 0 | 89.0 | 0 | 0 | -74.7 | 0 |
| NPV benefit to customers | | | | | | | | | | 14.3 |
| PV total benefit | 0 | 0 | 106 | 0 | 0 | 0 | 0 | 0 | -74.7 | 0 |
| NPV total benefit | | | | | | | | | | 31.3 |

As outlined in table C.9, the percentage of the time value of money benefits retained by the DNSP diminishes the later in the regulatory control period the capex was originally forecast to be spent and the later it is deferred.

**Table C.9: Percentage of time value of money benefits of deferring capex to the following regulatory control period retained by the DNSP without a capex EBSS**

| *Regulatory year in first period of original capex forecast* | *Regulatory year in following period into which capex deferred* | | | | |
|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* |
| *1* | 100% | 86% | 75% | 68% | 62% |
| *2* | 100% | 82% | 79% | 62% | 56% |
| *3* | 100% | 77% | 63% | 54% | 48% |
| *4* | 100% | 69% | 53% | 44% | 37% |
| *5* | 100% | 51% | 35% | 27% | 22% |

With an EBSS applied to capex, and when deferred capex can be included in capex forecasts for a subsequent regulatory control period, the incentive to defer capex to a later regulatory control period will also depend on the regulatory year in which it was forecast to be spent, and the regulatory year to which it is deferred. With an EBSS, a DNSP can receive a benefit greater than the time value of money benefit of deferring the capex. Table C.10 demonstrates the case of deferring capex forecast to be spent in the first regulatory year of a regulatory control period to the first regulatory year of the next regulatory control period.

**Table C.10: Impact of deferring regulatory year 1 capex to the first regulatory year of the next regulatory control period with an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 100 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Cumulative saving (F – A) | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Efficiency gain (E) | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carry-over of gains made in | | | | | | | | | | |
| 1 | | 6 | 6 | 6 | 6 | 6 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carry-over amount | | | | | | 6 | 0 | 0 | 0 | 0 |
| Discount factor | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.70 | 0.67 | 0.63 | 0.59 |
| DNSP benefit | 6 | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 6 | 5.7 | 5.3 | 5.0 | 4.8 | 4.5 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | 31.3 |
| PV benefit to consumers | | | | | | -4.5 | 0 | 0 | 0 | 0 |
| NPV benefit to customers | | | | | | | | | | -4.5 |
| PV total benefit | 106 | 0 | 0 | 0 | 0 | -79 | 0 | 0 | 0 | 0 |
| NPV total benefit | | | | | | | | | | 26.8 |

The benefit that a DNSP can receive from deferring capex to the next regulatory control period increases the later in the regulatory control period the capex was originally forecast to be spent. For example, as demonstrated in table C.11, a DNSP can receive 521 per cent of the time value of money benefits from delaying capex

from the last year of the regulatory control period to the first regulatory year of the next regulatory control period when an EBSS is in place. (In the example below the DNSP receives $31.3 million in benefits which represents 521 per cent of the total $6.0 million in benefits.)

**Table C.11: Impact of deferring year 5 capex to the first regulatory year of the next regulatory control period with an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* |
|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 0 | 0 | 0 | 0 | 100 | 100 | 0 | 0 | 0 | 0 |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 |
| Cumulative saving (F – A) | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 |
| Efficiency gain (E) | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 |
| Carry-over of gains made in | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | |
| 3 | | | | 0 | 0 | 0 | 0 | 0 | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | |
| 5 | | | | | | 6 | 6 | 6 | 6 | 6 |
| Carry-over amount | | | | | | 6 | 6 | 6 | 6 | 6 |
| Discount factor | 1.26 | 1.19 | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 |
| DNSP benefit | 0 | 0 | 0 | 0 | 6 | 6 | 6 | 6 | 6 | 6 |
| PV DNSP benefit | 0 | 0 | 0 | 0 | 6 | 5.7 | 5.3 | 5.0 | 4.8 | 4.5 |
| NPV DNSP benefit | | | | | | | | | | 31.3 |
| PV benefit to consumers | | | | | | -5.7 | -5.3 | -5.0 | -4.8 | -4.5 |
| NPV benefit to customers | | | | | | | | | | -25.3 |
| PV total benefit | 0 | 0 | 0 | 0 | 106 | -100 | 0 | 0 | 0 | 0 |
| NPV total benefit | | | | | | | | | | 6.0 |

As outlined in table C.12, the benefit to a DNSP of deferring capex to the next regulatory control period when there is an EBBS applied to capex often exceeds the time value of money benefits of the capex deferral. The longer the DNSP defers the capex, the lower the proportion of the time value of money benefits it receives. The later in the regulatory control period the capex was originally forecast to be spent the higher the proportion of the time value of money benefits the DNSP receives (this is opposite to the case where there is no EBSS, see table C.9).

**Table C.12: Percentage of time value of money benefits of deferring capex to the following regulatory control period retained by the DNSP with a capex EBSS**

| *Regulatory year in first regulatory period of original capex forecast* | *Regulatory year in following regulatory control period into which capex deferred* | | | | |
|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* |
| *1* | 117% | 100% | 88% | 79% | 72% |
| *2* | 142% | 117% | 100% | 88% | 79% |
| *3* | 184% | 142% | 117% | 100% | 88% |
| *4* | 268% | 184% | 142% | 117% | 100% |
| *5* | 521% | 268% | 184% | 142% | 117% |

When capex that has been deferred is excluded from capex forecasts, and an EBSS is applied to capex, the DNSP receives a constant proportion of the time value of money benefits from deferring capex to a later period. For example, table C.13 outlines the benefits to a DNSP and consumers of deferring capex forecast to be spent in regulatory year 3 of a regulatory control period to regulatory year 1 of the next regulatory control period.

**Table C.13: Impact of deferring regulatory year 5 capex to the first regulatory year of the next regulatory control period with an EBSS ($million, regulatory year 1 dollars)**

| *Regulatory year* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Forecast (F) | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Actual (A) | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | | | | | |
| Cumulative saving (F – A) | 0 | 0 | 100 | 0 | 0 | -100 | 0 | 0 | 0 | 0 | | | | | |
| Efficiency gain (E) | 0 | 0 | 6 | 0 | 0 | -6 | 0 | 0 | 0 | 0 | | | | | |
| Carry-over of gains made in | | | | | | | | | | | | | | | |
| 1 | | 0 | 0 | 0 | 0 | 0 | | | | | | | | | |
| 2 | | | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 3 | | | | 6 | 6 | 6 | 6 | 6 | | | | | | | |
| 4 | | | | | 0 | 0 | 0 | 0 | 0 | | | | | | |
| 5 | | | | | | 0 | 0 | 0 | 0 | 0 | | | | | |
| 6 | | | | | | | -6 | -6 | -6 | -6 | -6 | | | | |
| 7 | | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| 8 | | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| 9 | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | |
| 10 | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 |
| Carry-over amount | | | | | | 6 | 6 | 6 | 0 | 0 | -6 | 0 | 0 | 0 | 0 |
| Discount factor | 1.12 | 1.06 | 1 | 0.94 | 0.89 | 0.84 | 0.79 | 0.75 | 0.7 | 0.67 | 0.63 | 0.59 | 0.56 | 0.53 | 0.5 |
| DNSP benefit | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | -6 | -6 | -6 | 0 | 0 | 0 | 0 |
| PV DNSP benefit | 0 | 0 | 6 | 5.7 | 5.3 | 0 | 0 | 0 | -4.2 | -4.0 | -3.8 | 0 | 0 | 0 | 0 |
| NPV DNSP benefit | | | | | | | | | | | | | | | 5.0 |
| PV benefit to consumers | | | | | | 84 | -4.8 | -4.5 | 0 | 0 | -62.7 | 0 | 0 | 0 | 0 |
| NPV benefit to customers | | | | | | | | | | | | | | | 12.0 |
| PV total benefit | 0 | 0 | 106 | 0 | 0 | -89 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00 |
| NPV total benefit | | | | | | | | | | | | | | | 17.0 |

# Appendix D: Proposed application of the EBSS

This appendix has been prepared to clarify how the EBSS will operate.

For the EBSS to operate, information is required from DNSPs at the following stages:

- in a DNSP's regulatory proposal for the current regulatory control period
- in a DNSP's annual regulatory reports during the current regulatory control period
- in a DNSP's regulatory proposal for the following regulatory control period.

For each DNSP to respond appropriately to the incentives provided by the EBSS, it must be clear how the AER will use the information provided by each DNSP. The AER will provide guidance on how it will use the information provided in:

- the revenue determination for the current regulatory control period
- the revenue determination for the following regulatory control period.

The information required at these stages, and the guidance that will be provided by the AER is outlined below.

## The DNSPs' regulatory proposals for the current regulatory control period

The following information will be required from each DNSP in its regulatory proposal prior to the commencement of the current regulatory control period:

- a description of its capitalisation policy including any proposed changes to the policy and a calculation of the impact of those policy changes on forecast opex
- the proposed method for accounting for demand growth to be used at the end of the regulatory control period to adjust forecast opex for outturn demand growth (that is, to adjust for any changes in scale). The method proposed must be the same method as used to produce the opex forecasts.
- any proposed cost category exclusions for uncontrollable costs
- forecast opex for the current regulatory control period, including disaggregated forecasts for non-network alternatives and cost categories proposed to be excluded.

## The AER's final determination for the current regulatory control period

In its revenue determination for the current regulatory control period, the AER will determine whether or not the method for accounting for demand growth proposed by the DNSP is appropriate. The AER will publish the accepted or substituted demand growth adjustment method.

The AER will determine whether it has accepted the cost categories proposed by the DNSP to be uncontrollable costs. The AER will publish all the cost categories deemed to be uncontrollable and to be excluded from the operation of the EBSS.

The AER will determine whether the forecast opex proposed by the DNSP is efficient and publish the accepted or substitute levels of opex.

## Annual regulatory reports

In their annual regulatory reports during the next regulatory control period, each DNSP will be required to submit:

- any changes to capitalisation policy and a calculation of the impact of those policy changes on forecast opex
- actual opex disaggregated for non-network alternatives, recognised pass through events and cost categories determined to be uncontrollable and to be excluded from the EBSS.

## The DNSPs' regulatory proposals for the following regulatory control period

In their regulatory proposal for the following regulatory control period, each DNSP will be required to complete an EBSS template provided by the AER with the following information:

- the forecast opex accepted or substituted by the AER in the previous distribution determination
- a detailed description of any changes made to capitalisation policy during the current regulatory control period and a calculation of the impact of those changes on forecast opex during the current regulatory control period
- a detailed description of any changes in responsibilities during the current regulatory control period and a calculation of the impact of those changes on forecast opex during the current regulatory control period (that is, adjustments to forecast opex for any changes in scope). The change in responsibilities may have resulted from compliance with a new or amended law or licence, or other statutory or regulatory requirement, including a requirement that can be demonstrated to arise directly from a recognised practice or policy generally applicable to similar firms participating in the NEM.
- actual demand growth during the current regulatory control period and adjustments to opex forecasts for the current regulatory control period using the demand growth method accepted or substituted by the AER in the previous distribution determination (that is, adjustments to forecast opex for any changes in scale)
- actual opex during the current regulatory control period using the same cost categories as used to calculate the forecasts for that regulatory control period
- actual opex during the current regulatory control period for cost categories determined as uncontrollable by the AER in the previous regulatory determination

- actual opex for non-network alternatives during the current regulatory control period
- allowed increases or decreases in expenditure associated with recognised pass through events during the current regulatory control period.

The DNSP must also provide an explanation for the profile of opex during the current regulatory control period sufficient to demonstrate that opex during the regulatory control period did not entail any instances of cost shifting.

## The AER's final determination for the following regulatory control period

The AER will assess the EBSS outcomes proposed by the DNSP against the requirements of the EBSS. The carryover amounts, either positive or negative, accepted or substituted by the AER will be included as building block elements in the allowed revenue for the following regulatory control period.

## Adjustments to forecast and actual opex figures

In calculating the carryover amounts to be applied in the following regulatory control period, the EBSS will use adjusted forecast and actual opex figures. To ensure that the EBSS outcomes reflect genuine efficiency gains as far as possible, the EBSS uses adjusted forecast and actual opex figures. The AER will assess the adjustments proposed by DNSPs in their regulatory proposal for the following regulatory control period to ensure they are consistent with the EBSS.

### Capitalisation policy changes

Each DNSP must adjust the forecast opex figures used to calculate the carryover amount to account for changes in capitalisation policy. The adjusted forecast opex figures must reflect the capitalisation policy used in the calculation of the actual opex figures.

### Demand growth

DNSPs must adjust forecast opex figures to account for the difference between actual and forecast demand growth (that is, adjust for any changes in scale). Each DNSP must use the demand growth adjustment method accepted or substituted by the AER in its final determination for the current regulatory control period. The AER will assess whether the adjustments made are consistent with the method in the final determination.

### Regulatory responsibilities

DNSPs must adjust forecast opex figures to account for any changes in regulatory responsibilities that were made during the current regulatory control period and were not incorporated in the original forecast opex figures.

### Uncontrollable costs

Forecast and actual opex for cost categories accepted as being uncontrollable by the AER in the final determination for the current regulatory control period must be subtracted from the forecast and actual opex figures used to calculate the carryover

amounts. Proposed uncontrollable cost categories must be expense categories reported in DNSPs' regulatory accounts. DNSPs will not be allowed to make adjustments other than the removal of whole expense categories accepted by the AER as uncontrollable.

### Non-network alternatives

Opex incurred in undertaking non-network alternatives must be removed from both the forecast and actual opex figures used to calculate carry-over amounts. The AER will assess whether non-network alternative opex has been removed and that the sum removed is consistent with the amount reported in the DNSP's regulatory accounts.

### Recognised pass throughs

Recognised pass through event opex must be removed from the actual opex figures used to calculate carry-over amounts. The AER will assess whether the opex removed is consistent with the amount reported in the DNSP's regulatory accounts.

### Variances in cost categories and methodologies, and errors.

Adjustments may be made where necessary to correct for variances in cost categories and methodologies, and errors. The AER will assess the forecast and actual opex figures used to calculate carryover amounts to ensure that the forecast and actual figures are based on the same cost categories and methodologies and do not include any errors.

# Appendix E: Efficiency benefit sharing scheme