Advice on certain issues in relation to the Draft Expenditure Forecast Assessment and Efficiency Benefit Sharing Scheme Guidelines

20 September 2013

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1. Introduction and summary of conclusions

1.1 Terms of reference

1. I have been asked by Grid Australia to provide advice on certain matters in relation to the Expenditure Forecast Assessment Guideline (EFA Guideline), Capital Expenditure Sharing Scheme (CESS) and Efficiency Benefit Sharing Scheme (EBSS), being guidelines that the Australian Energy Regulator (AER) has published recently in draft form for consultation, accompanied with explanatory statements. Specifically, I have been asked to evaluate from the perspective of good regulatory practice the following matters:

   a. The AER's general approach to assessment (EFA guideline explanatory statement pp22-23 and further detail in following sections), including specifically:

      i. its proposed method to test whether NSPs respond to the incentive framework

   b. The AER's imposition of adjustments to the base year and a productivity adjustment to forecasts (EFA guideline explanatory statement section 4.2.2 and Appendix A in pp83-91), including:

      i. how pre-emptive removal of productivity from forecasts relates to the regulatory framework, in which NSPs receive benefits under the EBSS for sustained efficiency improvements

      ii. the impact of the AER's intent to potentially substitute an adjusted base year opex value instead of actual costs for the purposes of opex forecasting, whilst still using actual reported costs in that year for the purpose of applying the EBSS, and how this affects benefits sharing as between customers and NSPs, and the ability of the EBSS to achieve its stated objective of continuous opex efficiency incentives

   c. Relationship between expenditure forecasting and incentive frameworks (EFA guideline explanatory statement Chapter 5).

1.2 Preliminaries

2. My name is Jeff Balchin, and I am the Managing Director of Incenta Economic Consulting, a firm that specialises in advising in relation to economic regulation issues in the infrastructure sector. Prior to that I was a Principal at PricewaterhouseCoopers and prior to that a director at the Allen Consulting Group. I have 20 years of experience in relation to economic regulation and pricing issues across the electricity, gas, ports, airports and water sectors in Australia and New Zealand, having advised governments, regulators and major corporations on issues including the development of regulatory frameworks, regulatory price reviews and with respect to the negotiation of charges for unregulated infrastructure services. Relevant to this matter, I have had extensive experience advising both regulators and regulated entities with respect to the setting of regulated prices. This advice has included substantial advice on the design and

implementation of incentive compatible regulation and the related issues of the forecasting of expenditure requirements.

1.3 Summary of my conclusions

Context for the report

3. As background to the matters in my terms of reference, I read the AER's draft guidelines and explanatory material as proposing the following practice in relation to the assessment of forecasts of operating expenditure and the associated incentive arrangements:

   a. The "revealed cost approach" will be applied unless the AER concludes that the NSP in question does not respond to (financial) incentives. The "revealed cost approach" involves forecasting operating expenditure for the next regulatory period by commencing with the outturn expenditure for the current period (the "base year") and applying a "step" and "trend" to that starting point.

   b. The AER will test whether the base year can be assumed to reflect an efficient starting point by applying benchmarking techniques, including overall economic benchmarking as well as benchmarking of categories of expenditure. The purpose of this analysis will be to test the relative efficiency of NSPs and the change in productivity for the NSP in question over a historical period compared to other NSPs. If an NSP is adjudged not to be efficient compared to other NSPs then a downward adjustment may be applied to the "base year", with this downward adjustment flowing directly through to the expenditure forecast. The AER has observed that the potential for expenditure in the base year not to be efficient may arise where the incentives created by the regulatory regime are inappropriate (that is, where a clear and sufficient incentive for cost reduction is absent) or if the NSP does not respond to incentives.

   c. The "trend" is proposed to be estimated with reference to the measured historical growth in opex productivity for relevant NSPs, with certain constraints placed around that measure (such as the attempt to remove the effect of the productivity growth from inefficient firms catching up to the frontier). The "step" component will be limited to capture the cost consequences of a limited range of new factors (including new obligations and the substitution of capital for operating expenditure).

   d. The existing EBSS will continue to be applied largely as it is (with some modifications – such as more limited exclusions – that are not relevant to the matters addressed in this report), including in circumstances where the "base year" is adjusted (that is, where the NSP is found not to have responded to incentives). In this latter case, the EBSS will calculated using the relevant NSP's actual expenditure in the base year as the input, which in this circumstance will be different to the "base year" that is factored into the forecasts (the latter reflecting an adjusted base year).

4. In addressing my terms of reference, I have divided the matters for convenience into two sets of issues, namely those related to the AER's proposed method for assessing or setting the new operating expenditure allowance, and the question of whether the AER's proposal to apply the standard EBSS remains appropriate in the case where the AER

adjusts the base year. In relation to the first set of issues, I isolate four different aspects of the AER's proposed method for assessing or setting the new operating expenditure allowance for comment, namely:

a. Whether the AER's method for testing whether NSPs are efficient – which the AER has alternatively described as testing whether the incentives under the regime are appropriate and whether the NSP in question responds to incentives – is an appropriate method

b. When applying the revealed cost method, what should be factored into the "trend" and, in particular, whether it is appropriate to remove expected productivity gains in advance

c. How the base year should be tested for efficiency in the situation where there may be one off factors at play, and

d. Whether a rigid application of the "base step trend" method is appropriate where there are lumpy categories of operating expenditure, and what alternatives exist.

5. A summary of my views on these two sets of issues are set out in turn. I observe at the outset that I have assessed these matters against the standard of regulatory best practice and have considered the specific requirements of the National Electricity Law and Rules only I refer to such a provision directly.

AER's proposed approach to assess or set the operating expenditure forecasts

General observations

6. I agree with the AER's draft conclusion to continue to use as the principal means of deriving the operating expenditure forecast what has become known as the "revealed cost" method. The "revealed cost" method for forecasting reduces the risk to NSPs from regulatory error compared to alternative techniques, while simultaneously encouraging NSPs to pursue efficiency gains and for those gains to be passed on to customers, thus furthering the long term interests of consumers.

Method for testing whether firms are efficient (and responding to incentives)

7. Benchmarking techniques are likely to provide a very imprecise guide as to the efficiency of one NSP relative to others, particularly in the short term as datasets and techniques are being assembled and tested, but also into the long term given the limited sample size and heterogeneity of relevant Australian entities, particularly at the transmission level.

8. However, I agree with the AER that the concern that base year expenditure may be inefficient is likely to be most pressing where defects are present in the incentive scheme, or the NSP in question does not respond to incentives. In view of this, it would be appropriate for the AER to assess directly whether a problem is expected to exist, and to use this analysis as another source of evidence to assist in interpreting the results of the benchmarking analysis. The two questions – whether the incentives are appropriate and whether NSPs respond could be tested as follows:

a. *Incentives provided under the regime* – which should be able to be ascertained by analysing the financial implications of different decisions

b. *Response to incentives* – indicators or evidence that could be considered are:

   i. Analysing how an NSP's expenditure has tracked against the regulatory allowance, reflecting a potential for non-financially motivated firms to interpret regulatory allowances as budgets, rather than striving to outperform.

   ii. Reviewing the evidence of how the NSP in question makes its decisions, which would be an extension of the governance and process reviews that the AER has undertaken previously.

Pre-emptive removal of (anticipated) productivity gains

9. Prior to addressing how a productivity forecast may be derived, it is important to establish clearly the sources of past productivity gain that are relevant for inclusion in the forecast. Considerations in this regard include the following:

   a. The objective of the "revealed cost" method of creating a regime that is based on *achieved* rather than *predicted* efficiency – and so minimising the risk of regulatory error – will be increasingly compromised as more speculative sources of possible productivity growth are incorporated into the forecast.

   b. The productivity forecast should reflect what already-efficient firms would be expected to achieve and should also be independent of a particular firm's own past achievements, which are propositions the AER has also proposed.

   c. The productivity forecast should be consistent with the other aspects of the regulatory proposal, which implies (amongst other things) that it should:

      i. exclude productivity growth that is a consequence of efficiency-improving capital expenditure, and

      ii. exclude the reduction in productivity growth that would result from new obligations being imposed on NSPs in order to avoid a potential double counting (a matter raised by the AER).

   d. The forecast should capture, to the extent possible, the factors that are known to affect productivity change, including the rate of growth and relevant (external) business environment factors.

10. The capacity to apply empirical techniques to implement these principles is subject to the sufficiency of data, which is likely to be a constraint for all energy network sectors for some time. Moreover, for the transmission sector, the limited number of firms and their heterogeneity creates a prospect that using empirical estimates of global (opex) productivity improvement would not reflect an improvement on current practice (where relevant scale escalators are applied to different operating expenditure categories, and incorporate a productivity assumption).

11. Putting aside issues of data availability (with the following comments therefore more applicable to the derivation of a productivity forecast for the distribution sector):

    a. using econometric modelling of the cost function has advantages over alternatives (like the use of simple index number approaches) as important drivers of productivity – and their changes over time – can be taken into account (such as demand growth), and

    b. it is appropriate to include only sources of past productivity growth that can be identified and whose recurrence is reasonable to expect in the future

        i. it is reasonable to factor in productivity growth that is associated with economies of scale and related factors, however

        ii. a prudent approach to forecasting would exclude the residual time trend component – while this is often assumed to reflect technological change, it will be affected by anything that affects productivity that is also related to time, and may introduce inappropriate factors into the forecast.

Testing of the base year – treatment of one off factors

12. The AER has correctly recognised that, when it is testing the efficiency of an NSP's base year, is important to ensure that the expenditure in the base year is not affected by one off factors (and that adjustments are made if this is the case).

    a. The benchmarks against which the base year will be compared will be free or largely free from the effects of one off factors. This is a consequence of aggregating information across years and businesses, and may further be achieved through econometric means when applying such techniques.

    b. One off factors in the "base year" also should not be a material concern for the AER because there is a near-offsetting effect on the opex forecast and the EBSS.[1]

13. Several possible means exist to adjust for one off factors:

    a. One method would be to attempt to identify and remove the effect of one off factors from the base year.

    b. An alternative method would be to use an alternative year – year 3 rather than year 4 – as the base year, which the AER has employed previously, which would be appropriate if year 3 was thought to be largely unaffected by one off factors.

    c. A further alternative would be to compare the benchmarks against the average over a number of years (for example, the average of the first four years), although this would

[1] A one off factor will generate a positive EBSS for the NSP 6 years after the factor occurred. The act of paying upfront and then obtaining a refund in 6 years is what generates the NSP's approximately 30 per cent share of the cost of the event.

not remove the one off factor (but merely dilute it), and also require care to ensure time-consistency between the observed benchmark and the year being tested.

Forecasting lumpy operating expenditure items

14. One of the implications of the AER's proposed approach for determining the "step" and "trend" inputs into the application of the "revealed cost" approach is that forecasts will be independent of the extent of "work" that a specific NSP will need to undertake in the next period on existing activities (such as major maintenance tasks). This is a consequence of restricting the "step" adjustment to new obligations and setting the "trend" with reference to measured, past industry-wide productivity growth.

15. The AER's concern to ensure that the "revealed costs" are properly factored into the new forecasts is understandable, given that changes in cost are rewarded (and penalised) as if they are permanent. However, applying the "revealed cost" method rigidly has the potential to materially misstate expenditure expectations where there are material, lumpy categories of operating expenditure, and would only align with expenditure – even on average, over the long term – purely by chance.

16. The AER should explore whether there are alternative methods for deriving regulatory allowances for lumpy operating expenditure items that maintain the incentive properties of the revealed cost method and EBSS, while allowing for changes in efficient work volumes over time. An alternative that should also be considered for such categories of expenditure is to apply a "fit for purpose" forecasting method, and then to adjust the EBSS to be consistent with the forecasting method. As an example, if a bottom up forecast for lumpy operating expenditure items was adopted, an EBSS that is the same as the CESS could be applied.

Form of efficiency benefit sharing scheme when an adjustment is made to the base year

17. The AER has foreshadowed continuing to apply the standard EBSS even in cases where it decides that an NSP is found not to have responded to financial incentives and hence where a deemed inefficiency is deducted from the base year.

18. Applying the standard EBSS while also imposing an efficiency-adjustment to the base year is likely to result in a double counting of part of the efficiency adjustment in the situation where the NSP overspent in the base year, and hence the potential for the NSP to bear more than 100 per cent of the deemed inefficiency. This is because when the NSP overspends in the base year, the EBSS also will be affected.

19. Consistent with the position the AER has accepted in relation to the capital expenditure efficiency scheme, it is unreasonable for an incentive scheme to expose an NSP to more than 100 per cent of a deemed inefficiency. The outcome whereby no more than 100 per cent of the deemed inefficiency is borne could be restored by adjusting either the EBSS in cases where the base year is adjusted, or by applying a correction to the base year adjustment. The operating expenditure factors in the rules require the AER to take account of the interaction between incentive schemes and expenditure forecasts.

1.4 Structure of the remainder of this report

20. Chapter 2 elaborates upon the AER's proposed approach to assess or set the operating expenditure forecasts and chapter 3 addresses the issues arising from the choice of the form of EBSS when the "base year" is to be adjusted.

2. Method for assessing operating expenditure forecasts

2.1 General observations

21. One of the key conclusions from the AER's draft guidelines and associated explanatory papers is that it proposes to apply the "revealed cost" method as the principal method for deriving an operating expenditure forecast.

22. I support the AER's use of the revealed cost method as the principal means of obtaining such a forecast (although I note some areas where it may not be appropriate in section 2.5 below). At the core of the "revealed cost" method is that NSPs are provided with financial rewards for improving the efficiency of their expenditure (in combination with incentives or other measures to encourage optimal service performance) and then the observed outcomes are efficient or sufficiently close to being efficient to meet the requirements of the National Electricity Law in view of the inherent limitations of regulation. This information on efficient cost that is "revealed" through the operation of financial incentives (and the response to those incentives by the relevant NSP) is then used to assist in the performance of the regulator's tasks. Specifically in relation to operating expenditure, the "revealed cost" method is used to establish a starting point for deriving the forecast of operating expenditure for the next regulatory period (the "base year"), which is then converted into a forecast by applying an appropriate "trend" and adding on or deducting the cost associated with any relevant "step" changes in operating activities.[2]

23. The rationale for the "revealed cost" method is that it harnesses the financial interests of the NSPs to achieve efficiency, rather than requiring the regulator to attempt to judge for itself the efficiency of a particular outcome. By focussing on the design of incentives, the regulator's exposure to problems of information asymmetry between it and the NSP is minimised. Similarly, the risk to the NSP from errors in the regulator's decision making is also reduced. Moreover, by encouraging efficiency to be achieved, and ensuring that those gains are passed on to customers, it will maximise outcomes for society (by making best use of our scarce resources) and advance the long term interests of customers.

2.2 Method for testing whether firms are efficient (and responding to incentives)

24. As noted above, the AER has also stated that it will test whether the base year can be assumed to reflect an efficient starting point, which it intends to do by applying benchmarking techniques, which will include overall economic benchmarking as well as benchmarking of categories of expenditure. The outcome of this benchmarking will be comparisons of the relative efficiency of the different NSPs and the change in productivity for the NSP in question over a historical period compared to other NSPs. If an NSP is adjudged not to be efficient compared to other NSPs then a downward adjustment may be applied to the "base year", with this downward adjustment flowing directly through to the expenditure forecast. The AER has observed that the potential for

[2] For capital expenditure, the "revealed cost" method is used to establish an efficient opening RAB for a new regulatory period, and so avoid the need to assess the prudence of past expenditure.

expenditure in the base year not to be efficient may arise where the incentives created by the regulatory regime are inappropriate (that is, where a clear and sufficient incentive for cost reduction is absent) or if the NSP does not respond to incentives.

25. In my view, benchmarking techniques are likely to provide an imprecise guide as to the efficiency of one NSP relative to others. This imprecision is likely to be particularly marked in the short term as a reliable dataset is being assembled and methods are tested (and problems are found and resolved), but would be expected to persist even into the long term given the limited sample size of relevant Australian entities and the heterogeneity across those businesses, with this issue particularly marked at the transmission level.[3]

26. However, I agree with the AER that concern about the base year expenditure being inefficient is likely to be most pressing where it is considered that the financial incentives created for the NSPs are not aligned closely with efficient outcomes (in this case, minimising cost) and sufficiently large to motivate effort, or the NSP in question does not respond to those financial incentives. In view of the likely shortcomings in benchmarking discussed above, it would be appropriate for the AER to undertake a direct assessment of whether a "problem" is expected to exist, and to use this analysis as another source of evidence to assist in interpreting the results of the benchmarking analysis.

27. Turning to how the existence of a problem could be assessed, the first part of the inquiry – the appropriateness of the incentives created by the regime – can be ascertained by standard economic analysis, in turn involving an analysis of how the payoffs to NSPs under the regime change with different decisions (such as expenditure levels) and the testing the congruence of the payoffs to the NSP in question with desirable outcomes (such as cost minimisation).

28. In relation to the more difficult matter – namely whether a NSP is responding to financial incentives – it would be possible to have regard to a range of indicators on this matter. One indicator that is relevant is how an NSP's expenditure compares to the regulatory allowance that it received for the past period. Underspending against the regulatory allowance is evidence that the NSP did not treat the regulatory allowances as budgets, but rather was motivated to reduce its spending below what notionally was allowed.

29. A further source of evidence would be to review the evidence of how the NSP in question makes its decisions, and to gauge the importance of financial criteria in this regard. Such a review would be an extension of the governance and process reviews that the AER has undertaken previously when assessing expenditure forecasts, although it would also be appropriate for this review to look beyond the board and management of the entity to test the pressure that is provided by the firm's owners and financiers. As well as providing a test of the inferences that may be drawn from the benchmarking analysis as discussed earlier, this analysis may also identify where changes to the

[3] The issues with benchmarking have been set out in more detail on other material that has been provided to the AER, and so I have omitted further discussion of this issue.

governance and process of the entity or elsewhere could remedy incentive issues that are found to exist.

2.3 Pre-emptive removal of (anticipated) productivity gains

30. As discussed above, at the core of the "revealed cost" method is an attempt to reduce the potential for regulatory risk (whilst simultaneously improving the tractability of the task for the regulator). This is done by providing an incentive for efficient behaviour and then using the observed outcomes for regulatory purposes, rather than the regulator attempting to determine for itself what it considers to be the efficient outcome.

31. In relation to forecasting operating expenditure, the financial incentives inherent in the revealed cost method are directed to establishing an efficient starting point (the "base year"). Thus, an assumption is required about what should be assumed about the "trend" in expenditure after that point, which is typically (and correctly) disaggregated into a view about expected changes in real input prices, output growth and anticipated productivity growth.

32. With respect to the anticipated productivity gain, prior to discussing empirical techniques, it is relevant first to focus on the principles as to what the productivity assumption should be intended to include. My view on this matter is as follows.

    a. I agree that it would be incorrect not to assume any productivity gain when setting operating expenditure allowances given that the existence of economies of scale in networks means that output growth tends to generate productivity growth with little management initiative.[4] However, the effect of the productivity factor is to pass on a *possible* efficiency gain to customers before that gain has been achieved and so "revealed". The objective of the "revealed cost" method of creating a regime that is based on *achieved* rather than *predicted* efficiency – and so minimising the risk of regulatory error – will be increasingly compromised as more speculative sources of possible productivity growth – such as productivity improvement that requires substantial management initiative, effort and a degree of risk – are incorporated into the forecast.

    b. The AER has stated that it intends to derive a productivity forecast for already-efficient firms and to exclude the effect of less efficient firms catching up to their peers. I agree with this and note that this is important in order to avoid overstating the growth in productivity that an already efficient firm may achieve, as well as to avoid "double counting" with any base year adjustments.

    c. The AER has also noted that the productivity forecast should not reflect a particular firm's past achievements – as this would dilute the rewards for efficiency – which I also agree with.

[4] The AER's standard approach for assessing the operating expenditure forecasts for TNSPs has been to allow for scale economy factors, which has had the practical effect of including the scale economy component of total productivity growth.

d. Thirdly, the productivity forecast should be consistent with the other aspects of the regulatory proposal, which implies (amongst other things) that it should:

   i. exclude productivity growth that is a consequence of efficiency-improving capital expenditure,[5] and

   ii. exclude the reduction in productivity growth that would result from new obligations being imposed on NSPs in order to avoid a potential double counting of the cost of these obligations if they are also factored into the "step" changes, and

e. The forecast of future productivity change should also capture, to the extent possible, the factors that are known to affect productivity change, including the rate of growth and relevant business environment factors. I note in particular that the evidence the AER has pointed to during consultations suggests that the rate of productivity growth that is achievable will depend upon the rate of output growth that is expected (which is to be expected given the presence of economies of scale).[6] This means that measured productivity growth during periods when demand was growing quickly cannot simply be applied to periods when demand is growing less quickly, but must be adjusted to reflect that lower forecast of future demand growth.

33. The capacity to translate the principles above into a reliable empirical estimation process will be subject to the availability of data spanning the relevant variables over a sufficient period and for a sufficient number of entities. As commented earlier, constraints to such an exercise are likely to apply across the whole energy network sector as such a dataset is being assembled. Moreover, for the transmission sector, the limited number of firms and their heterogeneity raises the question of whether using empirical estimates of global opex productivity improvement could improve upon the current practice of applying scale escalators to different operating expenditure categories that reflect the characteristics of that category, and incorporate a productivity assumption.

34. Putting aside the issue of data availability (with the following comments therefore more relevant to distribution), I would offer the following comments on the AER's proposals.

a. The AER's stated preference is to derive a forecast of opex productivity growth through econometric modelling of the operating cost function, which I would support. The interdependence between demand growth and productivity is more easily managed with econometric modelling than the use of simple index number estimates of productivity growth. Econometric modelling also enables the sources of measured

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5 The AER has indicated that where a capital project is proposed that is justified as a substitution for operating expenditure, it will treat the saving in operating expenditure as a step change. If the required capital improvement project is not factored into the forecast of capital expenditure, then counting this source of productivity growth for operating expenditure would result in an assumed productivity growth that is greater than can be achieved given the capital expenditure forecasts, and so not provide a reasonable opportunity to recover efficient cost.

6 Lawrence, D., and J. Kain (Economic Insights) (2012), Econometric estimates of the Victorian gas distribution businesses' efficiency and future productivity growth, March.

productivity growth to be identified, and so permits an assessment of the relevance of each historical source of productivity growth to forecast growth.

b. Following from the point above, some caution needs to be exercised when deciding which sources of productivity growth are appropriately factored into the trend assumption required for the revealed cost approach. Estimates of past productivity growth are typically broken down onto that attributable to the realisation of economies of scale and, related to this, the effect of operating and maintaining a growing stock of assets, and changes to business environmental variables, and with a residual time trend that is assumed to reflect the effect of technological change. While it is difficult to argue against the inclusion of economies of scale and related factors in the productivity forecast, whether the residual time trend element should be included requires further consideration. In particular, while this trend may reflect, in part, the effect of (exogenous) technological improvement, it is likely to pick up any factor that is related to time, and may also include factors that are inappropriate to include in the productivity forecast, such as:

   i. the effect of the less efficient firms "catching up" to their peers, to the extent that this effect had not been able to be eliminated though alternative means[7]

   ii. productivity growth that is a consequence of efficiency-improving capital expenditure[8]

   iii. productivity growth that is the consequence of past one-off operating expenditures (such as corporate restructures and/or redundancy costs) that may have been excluded from consideration or not fully reflected in the productivity time trend, and

   iv. a reduction in productivity growth resulting from new obligations being imposed on NSPs.

35. A prudent approach to forecasting productivity growth – and one that is most consistent with the objective of the "revealed cost" method – would be to apply only sources of past productivity growth that can be identified and whose recurrence is reasonable to expect. As discussed above, at this stage this would imply including the effect of realising economies of scale associated factors and external business environment changes, but excluding residual time-trend effects.[9] As observed above, excluding these items would

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7 The AER suggests that it may be able to eliminate the "catch up" effect by observing TFP growth (which presumably was intended to refer to PFP growth) for the most efficient business or highly efficient businesses as a group (Draft Expenditure Forecasting Assessment Explanatory Statement, p.37). However, reducing the sample size in this manner will make it more difficult to apply econometric techniques, and so is not a perfect solution. Alternatives would be to attempt to allow for such periods of catch up econometrically or, as suggested here, to ignore the time trend component.

8 Given the increasing role of information and communications technology in the operation of modern utility businesses, it is reasonable to expect that at least part of the observed time trend in productivity growth for utilities would be a direct consequence of capital projects that were implemented to reduce operating costs.

9 This is not arguing against including technology-related productivity growth in the forecast of that growth, just that the effect of technological change would need to be able to be isolated from the other factors that have a relationship with time.

minimise the risk of inconsistency between the productivity forecast and other elements of the calculation of regulated prices, including the potential the AER has raised for the cost of new obligations to be double counted.

2.4 Testing of the base year – treatment of one off factors

36. One of the matters the AER has recognised as important when it is testing the efficiency of an NSP's base year is to ensure that the expenditure in the base year is not affected by one-off factors, which I agree with.

37. I observe that the benchmarks against which the base year will be compared will be free or largely free from the effects of one-off factors – this is a consequence of aggregating information across years and businesses, and may further be achieved through econometric means when applying such techniques. I also note for completeness that one-off factors in the "base year" should not be a material concern for the AER. This is because while the one off factor will raise the operating expenditure allowance, it will reduce the EBSS by the same extent for all years of the next regulatory period except the last, with the refund from customers for the one off factor being the mechanism for achieving the target share between the NSP and customers of the cost consequences of the one off factor.

38. Regarding the available mechanisms for adjusting for one off factors, one method would be to attempt to identify and remove the effect of one off factors from the base year. An alternative method would be to use an alternative year – year 3 rather than year 4 – as the base year, which the AER has employed previously. This would be appropriate if year 3 was thought to be largely unaffected by one off factors. Yet a further alternative would be to compare the benchmarks against the average over a number of years (for example, the average of the first four years), although this would not remove the one off factor (but merely dilute it), and also require case to ensure that changes in the operating expenditure for the NSP and the benchmarks is properly taken into account.

2.5 Forecasting lumpy operating expenditure items

39. One of the implications of the AER's proposed approach for determining the "step" and "trend" inputs into the application of the "revealed cost" approach is that forecasts will be independent of the extent of "work" that a specific NSP will need to undertake in the next period on existing activities (such as major maintenance tasks). This is a consequence of restricting the "step" adjustment to new obligations and setting the "trend" with reference to measured, past industry-wide productivity growth.

40. The AER's concern to constrain the factors built into the step and trend components is not without merit, and is consistent with the original intention of the "revealed cost" method for all drivers of expenditure (i.e., unit cost and volume and of work) to be revealed and fully factored into future forecasts, with subsequent trends based on industry wide factors. However, ignoring the future work volumes has the potential to materially misstate expenditure expectations where there are material, lumpy categories of operating expenditure, as is the case for certain categories of TNSP operating expenditure. Moreover, the operating expenditure allowance and would only align with expenditure – even on average, over the long term – purely by chance.

41. Accordingly, the AER should explore whether there are alternative methods for deriving regulatory allowances for lumpy operating expenditure items that maintain the incentive properties of the revealed cost method and EBSS, while allowing for efficient changes in work volumes over time.

42. An alternative approach that the AER should consider for such categories of expenditure is to apply a fit for purpose forecasting method, and then to adjust the EBSS to be consistent with the forecasting method. The purpose of adjusting the EBSS is to ensure that the amount of the efficiency gain that is classified as perpetual is limited to those factors where a revealed cost is applied mechanically into the next period.

43. As an example, the AER could forecast (and apply an EBSS) that assumes that the unit cost of work is "revealed" and factored into the next period forecasts, but that the work volumes are forecast exogenously (and possibly also that a change to work volumes would not be counted as an efficiency gain). An EBSS could then be derived that calculates the efficiency gain attributable to the NSP as:

    a. the difference between forecast and actual expenditure on these tasks (mirroring the treatment of capital expenditure), and

    b. with a further efficiency gain calculated on the assumption that the saving in unit costs generates a perpetual gain.

3. Efficiency benefit sharing scheme when the base year is adjusted

3.1 Introduction

44. As part of affirming its preference to use the "revealed cost" method as the principal means of assessing operating expenditure forecasts, the AER has decided to commit to apply the standard EBSS.

45. The AER's commitment to lock in the form of EBSS was consistent with many representations that were made to it, and would provide for greater certainty as to how the benefits from efficiency gains would be calculated. However, I note that the AER has foreshadowed continuing to apply the standard EBSS even in cases where it has made an adjustment to the base year to remove a deemed inefficiency component. Applying the standard EBSS in this situation has the potential to expose the NSP to more than 100 per cent of the deemed inefficiency, which is an outcome that is unreasonable, as the AER has recognised in the context of the treatment of capital expenditure that has been disallowed (that is, under the ex post prudence test) in the capital expenditure incentive scheme.

46. I observe at the outset, however, that two methods exist to ensure that NSPs do not bear more than 100 per cent of the deemed inefficiency, which are to:

    a. apply an adjusted EBSS in the circumstances where the base year is adjusted, or

    b. factor in the effect of the EBSS when deciding upon the magnitude of the base year adjustment.[10]

3.2 Further analysis

3.2.1 Assumptions behind the EBSS carry over

47. As I have previously shown,[11] the EBSS that is carried over into the next period can be broken down into two components, namely:

    a. A correction to the share of cost savings that the NSP retained during the previous regulatory period, and

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10 This adjustment would imply that the operating expenditure forecast considered in isolation would not reflect the forecast of efficient cost; however, the operating expenditure forecast considered in combination with the EBSS carry over (or components of the latter) would reflect the forecast of efficient cost. This ability to consider the operating expenditure forecast in combination with EBSS outcomes is facilitated by rule 6A.6.6(e)(8), which requires regard to be had to "whether the operating expenditure forecast is consistent with any incentive scheme or schemes that apply to the Transmission Network Service Provider under clauses 6A.6.5, 6A.7.4 or 6A.7.5". The AER has observed in many places in its discussions the need to consider expenditure allowances in combination with the outworking of incentive schemes.

11 Balchin, J., Memorandum to Grid Australia Regulatory Managers: Integration of opex forecasting with the efficiency benefit sharing scheme: transitional issues, 29 May 2013.

b. A share of the (assumed) perpetual change in the cost level in future periods – that is, any change in the cost level compared to the forecast at the end of the regulatory period is assumed to continue (and flow through to customers) in perpetuity, and the NSP receives the target share of this (as a benefit or a penalty).

48. If an NSP consistently underspends (or overspends) against the regulatory allowance over the period, then these two components will have opposite signs; however, the latter would normally dominate. That is, for an NSP that underspent:

a. During the regulatory period, the NSP would have retained 100 per cent of the benefit from the underspend, and so a return of part of that gain (through a negative EBSS) is required in order to achieve the target sharing ratio of 30 per cent.

b. However, the NSP does not receive any of the perpetual gain during the regulatory period, and so a positive EBSS is required to achieve its 30 per cent share of this gain.

49. Figure 1 shows the outcome for a NSP that overspends against the regulatory allowance in the first regulatory period under the standard application of the revealed cost / revealed cost EBSS, where this overspend is assumed for simplicity to be a step increase from the start of year 3.[12] It also shows how the EBSS can be separated into the components described above (namely the correction of the within period sharing and the sharing of the perpetual effect), using two methods, namely:

a. applying an alternative, but mathematically identical, calculation of the EBSS carry over, where the "within period correction" and the share of the (perpetual) change in costs are calculated explicitly:

i. the correction to the within period sharing is calculated in the same manner as the EBSS treats one off events, namely that the NSP bears the whole cost initially, and then that amount is effectively refunded six years later (through the EBSS including an increment that is equal in magnitude but opposite in sign). The bearing of the cost for six years is what creates the NSP's 30 per cent share after the time value of money is considered, and

ii. the NSP's bearing of 30 per cent the increase in costs that is passed on to customers is achieved through the NSP being precluded from recovering that (permanent) cost increase for six years (that is, from years 6 to 11 in this example), and

[12] This figure and those following assume for simplicity that there is no trend applied to the forecasts, and that no underling trend is reflected in the actual expenditure, which does not alter the interpretation of the results. The WACC figure has been selected to be consistent with generating a 30 per cent benefit sharing ratio. The precise magnitude of the WACC figure does not affect the interpretation of the results.

b. converting the EBSS into an equivalent NPV calculation that I have previously presented,[13] in which the "within period correction" and perpetual effect are calculated explicitly.

50. The key results from the analysis of the components of the EBSS set out above are observed in rows 32 and 43, and are as follows:

a. Rows 3 and 28 to 32 show that while the operating expenditure allowance will rise by the amount of the first period overspend from the commencement of the next regulatory period, the negative element to the EBSS will prevent the NSP from recovering that overspend amount for the whole of the next regulatory period and a further year beyond (the NSP's absorption of the cost increase for six years is what creates its 30 per cent sharing of the increase).

b. Row 43 shows the same result through an NPV calculation of the EBSS, namely that the overspending at the end of the period – and assumed pass through of that overspending to customers – generates a negative EBSS carry over.

[13] Balchin, J., Memorandum to Grid Australia Regulatory Managers: Integration of opex forecasting with the efficiency benefit sharing scheme: transitional issues, 29 May 2013.

Figure 1: Components of the "revealed cost" EBSS when an NSP overspends in the base year

[1]	Carry over period (years)	6											
[2]	WACC (real)	6.12%											
[3]	Implied "target share" of efficiency gains	30.0%											
[4]													
[5]	**Regulatory year**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
[3]	Forecast opex		100	100	100	100	100	110	110	110	110	110	110
[4]	Actual opex		100	100	110	110	110	110	110	110	110	110	110
[5]	Actual opex for EBSS (deemed for year 5)		100	100	110	110	110	110	110	110	110	110	110
[6]	Underspend for EBSS		0	0	-10	-10	-10	0	0	0	0	0	0
[7]	Incremental gain for EBSS		0	0	-10	0	0	0	0	0	0	0	0
[8]	*Incremental gain for year 1*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[9]	*Incremental gain for year 2*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[10]	*Incremental gain for year 3*		*0*	*0*	*-10*	*-10*	*-10*	*-10*	*-10*	*-10*	*0*	*0*	*0*
[11]	*Incremental gain for year 4*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[12]	*Incremental gain for year 5*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[13]	*Incremental gain for year 6*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[14]	Benefit retained by NSP during regulatory period		0	0	-10	-10	-10	0	0	0	0	0	0
[15]	EBSS carry over from previous period(s)							-10	-10	-10	0	0	0
[16]	**Total benefit to NSP**		**0**	**0**	**-10**	**-10**	**-10**	**-10**	**-10**	**-10**	**0**	**0**	0
[17]	**Opex factored into customer price**		**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**110**	**110**	**110**
[18]													
[19]	Discount factor (to calculate NPV as at start of yr 6)		1.268	1.195	1.126	1.061	1.000	0.942	0.888	0.837	0.789	0.743	0.700
[20]													
[21]	***EBSS carry over***												
[22]	Benefit/penalty during period	NPV	-31.87										
[23]	*Explicit EBSS Carry over*	*NPV*	*-26.67*										
[24]	*Implicit EBSS carry over (year 5)*	*NPV*	*0.00*										
[25]	Total EBSS carry over	NPV	-26.67										
[26]	**Total benefit/penalty**	**NPV**	**-58.54**										
[27]													
[28]	***Decomposing the EBSS into (i) the correction of "within period" sharing, and (ii) phase in of change in the cost level***												
[29]	**Regulatory year**							**6**	**7**	**8**	**9**	**10**	**11**
[30]	Correction of "within period" share	NPV	22.32						0	0	10	10	10
[31]	Phase in of change in base year cost level	NPV	-48.99					-10	-10	-10	-10	-10	-10
[32]	**Total EBSS carry over**	**NPV**	**-26.67**					**-10**	**-10**	**-10**	**0**	**0**	**0**
[33]													
[34]	***Alternative calculation of the EBSS and decomposition: NPV Equivalent calculation***												
[35]	Cost saving/increase during period	NPV	-31.87										
[36]	Perpetual cost saving/increase (incl. yr 5)	NPV	-163.40										
[37]	**Total cost saving/increase**	**NPV**	**-195.27**										
[38]	*Target share (30%) of during period saving/increase*	*NPV*	*-9.56*										
[39]	*Share already received of during period savings*	*NPV*	*-31.87*										
[40]	EBSS carry over - correcting within period sharing	NPV	22.32										
[41]	*Target share (30%) of perpetual saving/increase*	*NPV*	*-48.99*										
[42]	*Share already received of prepetual saving/increase*	*NPV*	*0.00*										
[43]	EBSS carry over - providing share of perpetual	NPV	-48.99										
[44]	*Target share (30%) of total saving/increase*	*NPV*	*-58.54*										
[45]	*Total share already received*	*NPV*	*-31.87*										
[46]	**Total EBSS**	**NPV**	**-26.67**										

3.2.2 Application of the EBSS where the base year is adjusted

51. The conclusion from the discussion above is that where the NSP is overspending at the end of one regulatory period then this will give rise to a negative element in the EBSS carry-over into the next period. This negative element has the effect of reducing the effective allowance for operating expenditure in the next period – more specifically, the EBSS will preclude the NSP from recovering the overspending for the whole of the next regulatory period and one year beyond.[14]

14 As discussed above, the EBSS may be less negative than required to offset the increase in operating expenditure, or even positive in total. This is because the EBSS also restores the NSP's share of overspending borne within the previous period to the target of 30 per cent, rather than the initial 100 per cent that is borne initially.

52. It follows from this conclusion that if the NSP had been overspending at the end of the previous regulatory period (which means in the base year),[15] and the AER adjusts down the base year to remove a deemed inefficient component, then part of that deemed inefficiency will be double counted. More specifically, the deemed inefficiency will be double counted by approximately the same amount that the NSP overspent in the base year. This result is shown in Figure 2 below (the term "approximately" is used to reflect the fact that the standard EBSS extends the penalty beyond the next regulatory period, i.e., into year 11 in the example below, which I ignore for simplicity).

Figure 2: double counting of the "deemed inefficiency" where an NSP overspent in the base year

[1]	Carry over period (years)	6											
[2]	WACC (real)	6.12%											
[3]	Implied "target share" of efficiency gains	30.0%											
[4]	Base year adjustment	-17											
[5]													
[6]	**Regulatory year**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
[4]	Forecast opex		100	100	100	100	100	93	93	93	93	93	110
[5]	Actual opex		100	100	110	110	110	110	110	110	110	110	110
[6]	Actual opex for EBSS (deemed for year 5)		100	100	110	110	110	110	110	110	110	110	110
[7]	Underspend for EBSS		0	0	-10	-10	-10	-17	-17	-17	-17	-17	0
[8]	Incremental gain for EBSS		0	0	-10	0	0	-17	0	0	0	0	0
[9]	*Incremental gain for year 1*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[10]	*Incremental gain for year 2*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[11]	*Incremental gain for year 3*		*0*	*0*	*-10*	*-10*	*-10*	*-10*	*-10*	*-10*	*0*	*0*	*0*
[12]	*Incremental gain for year 4*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[13]	*Incremental gain for year 5*		*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[14]	*Incremental gain for year 6*		*0*	*0*	*0*	*0*	*0*	*-17*	*-17*	*-17*	*-17*	*-17*	*-17*
[15]	Benefit retained by NSP during regulatory period		0	0	-10	-10	-10	-17	-17	-17	-17	-17	0
[16]	EBSS carry over from previous period(s)							-10	-10	-10	0	0	-17
[17]	**Total benefit to NSP**		**0**	**0**	**-10**	**-10**	**-10**	**-27**	**-27**	**-27**	**-17**	**-17**	-17
[18]	**Opex factored into customer price**		**100**	**100**	**100**	**100**	**100**	**83**	**83**	**83**	**93**	**93**	**93**
[19]													
[20]	Discount factor (to calculate NPV as at start of yr 6)		1.268	1.195	1.126	1.061	1.000	0.942	0.888	0.837	0.789	0.743	0.700
[21]													
[22]	***Decomposing the EBSS into (i) the correction of "within period" sharing, and (ii) phase in of change in the cost level***												
[23]	**Regulatory year**							**6**	**7**	**8**	**9**	**10**	**11**
[24]	Correction of "within period" share	NPV	22.32						0	0	10	10	10
[25]	Phase in of change in base year cost level	NPV	-48.99					-10	-10	-10	-10	-10	-10
[26]	**Total EBSS carry over**	**NPV**	**-26.67**					**-10**	**-10**	**-10**	**0**	**0**	**0**
[27]													
[28]	***Double counting of the efficiency adjustment***												
[29]	**Regulatory year**							**6**	**7**	**8**	**9**	**10**	**11**
[30]	Efficiency adjustment built into the EBSS							-10	-10	-10	-10	-10	-10
[31]	Deemed inefficiency - AER base year adjustment							-17	-17	-17	-17	-17	na
[32]	**Total efficiency adjustment**							**-27**	**-27**	**-27**	**-27**	**-27**	**na**
[33]	**Efficiency adjustment that is double counted (approx)**							**-10**	**-10**	**-10**	**-10**	**-10**	**na**

53. In this example, the NSP is assumed to have overspent (by 10) in the base year, and the AER determines that the base year is inefficient by 17, and adjusts the base year by this magnitude. However, as demonstrated previously, the EBSS already imposes an effective adjustment to the operating expenditure allowance by the amount of the overspending allowance (10, see rows 22 to 26), so that the effect of simply adjusting the base year in this manner would imply a total efficiency adjustment of -27 per annum, double counting the adjustment already implicit in the EBSS. The effect of this would be to expose the NSP to more than 100 per cent of the deemed inefficiency.[16] As discussed in the opening

15 Under the standard EBSS, expenditure in year 5 is assumed to be such that there is no change in the incremental outperformance between the base year and year 5, irrespective of which year is selected as the base year. This means that any underspending in the base year will be translated into an assumed level of underspending in year 5.

16 This is the loss the NSP would suffer if it is able to reduce its expenditure level in excess of the trend assumption that is applied.

to this chapter, a correction to either the EBSS or the base year adjustment would be required in order to prevent the NSP from being exposed to more than 100 per cent of its deemed inefficiency.

3.2.3 Application of the EBSS for periods after a base year adjustment has been applied

54. The discussion above assumed that it would be reasonable for the NSP to retain the element of the EBSS that has the effect of restoring the sharing ratio of 30 per cent for any overspending during the previous regulatory period. As rows 30 and 38 to 40 of Figure 1 showed, where a firm had overspent during a period, this element would be positive – this is because the NSP would initially bear 100 per cent of the overspend, and a correction is therefore required to return this share to the intended 30 per cent.

55. Where the base year adjustment is applied for the first time, then it would appear reasonable for the NSP to retain this element of the EBSS as the intention was that an NSP would only bear 30 per cent of any marginal charges in cost. However, in periods after the AER has proposed a base year adjustment, then it could be seen as less reasonable for the NSP to retain this positive element – this reflects the fact that the intent would be that the NSP would bear 100 per cent of the deemed inefficiency.

56. Even if the NSP is required to bear 100 per cent of the deemed inefficiency for the preceding period, then a subsequent application of a base year adjustment in combination with the application of the standard EBSS would still expose the NSP to more than 100 per cent of the deemed inefficiency in that period ahead. This result is shown in Figure 3.

Figure 3: future applications of a base year adjustment and standard EBSS

[1]	Carry over period (years)	6															
[2]	WACC (real)	6.12%															
[3]	Implied "target share" of efficiency gains	30.0%															
[4]	Base year adjustment	-7															
[5]																	
[6]	**Regulatory year**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
[4]	Forecast opex		100	100	100	100	100	93	93	93	93	93	93	93	93	93	93	93
[5]	Actual opex		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
[6]	Actual opex for EBSS (deemed for year 5)		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
[7]	Underspend for EBSS		0	0	0	0	0	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
[8]	Incremental gain for EBSS		0	0	0	0	0	-7	0	0	0	0	-7	0	0	0	0	-7
[9]	*Incremental gain for year 1*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[10]	*Incremental gain for year 2*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[11]	*Incremental gain for year 3*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[12]	*Incremental gain for year 4*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[13]	*Incremental gain for year 5*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[14]	*Incremental gain for year 6*	*6*	*0*	*0*	*0*	*0*	*0*	*-7*	*-7*	*-7*	*-7*	*-7*	*-7*	*0*	*0*	*0*	*0*	*0*
[15]	*Incremental gain for year 7*	*7*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[16]	*Incremental gain for year 8*	*8*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[17]	*Incremental gain for year 9*	*9*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[18]	*Incremental gain for year 10*	*10*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
[19]	*Incremental gain for year 11*	*11*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*-7*	*-7*	*-7*	*-7*	*-7*	*-7*
[20]	Benefit retained by NSP during regulatory period		0	0	0	0	0	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
[21]	EBSS carry over from previous period(s)							0	0	0	0	0	-7	0	0	0	0	-7
[22]	**Total benefit to NSP**		**0**	**0**	**0**	**0**	**0**	**-7**	**-7**	**-7**	**-7**	**-7**	-14	-7	-7	-7	-7	-14
[23]	**Opex factored into customer price**		**100**	**100**	**100**	**100**	**100**	**93**	**93**	**93**	**93**	**93**	**86**	**93**	**93**	**93**	**93**	**86**
[24]																		
[25]	Discount factor (to calculate NPV as at start of yr 6)		1.268	1.195	1.126	1.061	1.000	0.942	0.888	0.837	0.789	0.743	0.700	0.660	0.622	0.586	0.552	
[26]																		
[27]	Deemed inefficiency (years 6 to 10)	NPV	29.39															
[28]	Penalty for the NSP	NPV	34.29															
[29]	NSP share of inefficiency		117%															

57. This figure assumes that the NSP had spent precisely at the forecast level in the first regulatory period, and that the base year is adjusted downwards (by 7 this time, again consistent with the benchmarked efficient cost of 93). The same downward adjustment to

the base year is assumed to be made at the end of the next regulatory period and at the end of the regulatory period beyond. The outcome is that while the NSP (under the assumption that it was unable to respond) would continue to overspend by 7 per annum – or by 35 in each regulatory period – it would be penalised by 42 in respect of each regulatory period. This arises because:

a. the regulatory allowance would step down by the amount of the base year adjustment (7) between years 5 and 6, as well as between years 10 and 11

b. if the NSP maintained expenditure at the previous level,[17] then it will make a shortfall equal to the amount of the base year adjustment for each year of the regulatory period (7 per annum in this simple example)

c. in addition to this direct penalty, the EBSS that is applied at the end of the period will calculate an efficiency loss (of 7) for year 6, and require this to be borne for a further 5 years after year 6, implying a negative carry over into year 11 and 16

d. implying that the NSP would bear a penalty of 18 for each regulatory period, implying a 117 per cent share to the NSP of the deemed inefficiency.

58. It can also be seen from Figure 3 that the deemed inefficiency is deducted twice from the operating expenditure that is factored into customer prices once every five years, which is the outworking of the NSP bearing more than 100 per cent of the deemed inefficiency.

59. Again, a correction to either the EBSS or the base year adjustment would be required in order to prevent the NSP from being exposed to more than 100 per cent of its deemed inefficiency.

[17] As noted above, this figure assumes a zero trend in the regulatory allowance over the periods for simplicity. In reality, a trend would be applied, reflecting, amongst other things, anticipated productivity growth, which would also need to be achieved by the NSP to not change its level of efficiency.