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Dr John Tamblyn
Chairman
Australian Energy Market Commission
PO Box A2449
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Dear Dr Tamblyn

Total Factor Productivity Review - Framework and Issues Paper, EMO0006

The AER appreciates the opportunity to comment on the AEMC's Framework and Issues Paper for its review into the use of total factor productivity (TFP) for the determination of prices and revenues of gas and electricity network businesses.

We support the review of TFP and other alternatives to the current building blocks approach that could be implemented to achieve progressive improvements to the current regulatory arrangements. The AER sees this review as an important opportunity to consider improvements to the current building block approach as well as the potential future development of other approaches, including TFP.

The AER considers that there is likely to be merit in adopting the use of TFP as a 'benchmarking tool' under the current building blocks method. This would enhance the information available to the AER to assess the relative efficiency of energy network businesses when considering their cost forecasts in regulatory proposals. Such an approach can be implemented as an initial step prior to the further consideration and possible development of TFP as a revenue or price setting method, in parallel with the structured and systematic collection of TFP data on a national basis. This could take the form of a multi-stage process for the examination and possible implementation of TFP or other approaches.

The AER also believes that the framework for the AEMC's review would benefit from a clearer statement outlining the key problem(s) regarding the current regulatory arrangements

that the review seeks to address. In this context, the AER considers that the AEMC should adopt a cautious approach regarding its recommendations on the possible future implementation of TFP, and not see TFP as a 'panacea' capable of correcting all perceived shortcomings associated with the building blocks approach.

The AER has provided more specific comments on the Framework and Issues Paper in the attachment to this letter. The comments are generally of a high level nature and focus on the nature and scope of the review together with certain data-related issues. The AER has not commented on detailed technical aspects of the TFP methodology since it considers it is important to first address how the TFP methodology should be assessed in terms of its possible role in energy regulation.

The AER will provide further input on the AEMC's review as the review progresses.

Should you or your staff wish to discuss this submission, please contact Chris Pattas on (03) 9290 1470 or Darren Kearney on (03) 9290 1966.

Yours sincerely

Steve Edwell
Chairman
Australian Energy Regulator

Framework and assessment criteria for the review

The AER supports a review of TFP and its possible use in further improving the regulatory framework in the NER and NGR. In particular, the review presents a timely opportunity to consider improvements to the current building block approach and the possible role of TFP in this regard.

While the AER recognises that previous consideration of TFP was undertaken by the Expert Panel on Energy Access Pricing[1] and that the AEMC's review follows a proposed rule change from the Victorian Government, the framework for the review would benefit from a clearer statement outlining the key problem(s) regarding the current regulatory arrangements that the review seeks to address. Without clear identification and understanding of the problem(s) at hand, there is a risk that any measures or interventions that are taken will not address the problem(s), or only partially address it, or that alternative interventions will be overlooked which could address the problem(s) more effectively or efficiently.

More clearly identifying and understanding the problem(s) that needs to be addressed; identifying the full range of options for addressing the problem(s); and undertaking a careful cost-benefit consideration of those options, would provide a more structured and transparent approach to the review and is more likely to lead to a better policy outcome.

This might involve conducting the review in two stages, with the first stage focussed on identifying concerns and the second stage focussed on identifying possible solutions. Alternatively, the two stages could be combined into one by highlighting potential concerns and asking for feedback on the magnitude of those concerns and on the potential options for addressing the concerns.

Generally, the perceived problems associated with the building block approach chiefly concern its administrative cost to the regulator and regulated businesses, the strength of efficiency incentives that it provides for regulated businesses, and the tendency for information asymmetries to arise between the regulator and regulated businesses. Options available to address the problems may include modification of the existing building block approach, the development of TFP, a hybrid of the two approaches, or other alternatives, including other possible benchmarking approaches.

The criteria to test whether a TFP based methodology would contribute to the achievement of the National Electricity Objective (NEO) and the National Gas Objective (NGO), listed on pages 8-9 of the Framework and Issues Paper, is generally appropriate. However, to fully reflect the NEO and NGO, the assessment criteria should also have more explicit regard to the ability of TFP to support the long term interests of consumers of energy with respect to quality, safety, reliability and security of supply.

The review process should also involve a comprehensive cost-benefit perspective (including, for example, analysis of compliance costs and where relevant, risk) for the consideration of TFP and other approaches as compared to the existing building block approach. Such a cost-benefit perspective should be applied to each sub-sector under consideration for application of TFP – to take account of sector differences across the electricity/gas and

[1] Expert Panel on Energy Pricing, (April 2006), "Report to the Ministerial Council on Energy".

distribution/transmission sectors. This would test whether a move to TFP or another approach is likely to result in a net public benefit in terms of expected regulatory outcomes.

TFP approach under consideration

The AEMC's Framework and Issues Paper, in particular Appendix B, outlines the building block and TFP methodologies, and the application of TFP as a benchmarking tool under the building block approach. This discussion, and the approach to TFP proposed in the Victorian Government's 2008 TFP rule change proposal, reflects that there is a spectrum of potential approaches to employing TFP.

As reflected in the discussion in the AEMC's Framework and Issues Paper (and appendices), TFP is considered as a measure of productivity at the firm, industry or nation level that can be defined by a ratio of a measure of total outputs to an index of inputs used. Unlike regulators in overseas jurisdictions that have used estimates of TFP growth at the industry level (or in some cases, firm-specific productivity performance) in price or revenue regulation, the Australian regulatory practice in the electricity and gas distribution/transmission sectors is the adoption of the building block method (BBM). The building block method, in periodic determinations of prices or revenues, typically involves a forecast of efficient costs of the regulated business for the next regulatory period using a bottom-up approach that adds up all components of cost, including a 'reasonable' return on capital employed, depreciation, operating cost, etc. Maximum allowed revenues over the period are then set by equalising the revenues to the forecast costs in present value terms, in accordance with a 'CPI–X' formula, under which prices or revenues (e.g. under the post-tax revenue model developed by the AER) change at an annual rate of CPI less a smoothing factor X. The assessment of the efficient costs often relies on firm-specific estimates of the potential scope of efficiency and productivity improvements, as opposed to the information on comparator firms or hypothetical efficient firms.

The applications of TFP provide alternative approaches to the current BBM. Depending on the extent to which TFP is used in a regulatory determination, the possible application of TFP can be broadly classified into the following categories:

- TFP could be used as an informative tool to assist the regulator in assessing the cost forecasts submitted by regulated businesses under the BBM model. This is the benchmarking option discussed in the AEMC's Framework and Issues Paper. Under this option, the existing building block approach to price regulation would be maintained, but with the computation of TFP growth rates occurring in parallel to provide information to the regulator on industry performance to enable comparison between a business's proposed costs with a measure of efficient benchmark costs.

- A hybrid approach, under which the initial price or revenue level (for the first time and for any subsequent price review) would be set using a one-year BBM model to align revenues with efficient costs, and a productivity offset factor based on industry TFP growth used to set an X factor in determining the price or revenue path over the regulatory period between BBM-based price reviews.

- A pure TFP approach whereby a productivity offset factor based on industry TFP growth would be used to set an X factor in determining the price or revenue path over the

regulatory period with an initial price or revenue level set at an appropriate level. This approach would see no continuation of the bottom-up BBM.

Both the latter two approaches appear to be consistent with the full application of the TFP option discussed in the AEMC issues paper (section 1.3.2) and are consistent with the CPI–X price cap regulation under which X is the 'productivity offset factor'.[2] The design of CPI–X could take many forms. The extreme case (rarely used in practice) is pure price cap regulation that completely delinks the allowed prices or revenues from the out-turned earnings (e.g. through no resetting of price to align with efficient cost at the time of price review). This form of regulation is often argued to provide very strong incentives for the regulated businesses to improve efficiency and productivity. However, in practice, less pure variants of price cap regulation are adopted.

The administrative costs of regulation can be represented as a continuum, running from high to low. The current building block approach can be viewed as sitting towards the high end of this continuum. A 'pure' TFP approach, where the X factor is 'set and forgotten', can be viewed as sitting at the opposite, low cost end of the continuum. Where a 'pure' TFP approach is diluted to take account of various business-specific and other factors, there is a move along the cost continuum towards the high end (and essentially back to the building blocks position), as well as a potential diminution of incentive properties. Given that the major reasons for the introduction of TFP appear to include reduced administrative costs and greater incentive properties, this is an important consideration for the replacement of the building blocks approach with TFP.

Introduction of a 'hybrid' TFP option and/or the 'TFP as a benchmarking tool' option would sit higher on the cost continuum than the current building blocks method, as they would involve the continuation of the current building blocks approach, with the additional cost of TFP calculation. Allowing regulated businesses the choice of opting for the TFP or building blocks approach would also result in additional administrative costs, although where TFP is applied, less intensive 'bottom-up' assessments of business costs should result in administrative savings. However, refining the BBM through use of TFP may also lead to potential benefits in terms of improved regulatory outcomes, notwithstanding some increase in administrative costs.

It is to some extent unclear from the Framework and Issues Paper what approach to TFP (eg 'pure' /'hybrid') would be considered by the AEMC in the counterfactual assessment of TFP against the current building block approach (referred to in section 2.4 of the Framework and Issues Paper).

The AER considers that there is likely to be merit in adopting the use of TFP as a 'benchmarking tool' under the current building blocks method in the medium term. This would enhance the information available to the AER to assess the relative efficiency of energy network businesses when considering their cost forecasts in regulatory proposals. Such an approach can be implemented as an initial step prior to the further consideration and

[2] See, for examples, Sappington, D. (2002), 'Price Regulation and Incentives', in M. Cave, S. Majumdar and I. Vogelsang (eds.), *Handbook of Telecommunications Economics*, Amsterdam: Elsevier Publishers; Vogelsang, I. (2002), 'Incentive Regulation and Competition in Public Utility Markets: A 20-Year Perspective', *Journal of Regulatory Economics*, Vo. 22, pp. 5 – 27.

possible development of TFP as a revenue or price setting method, in parallel with the structured and systematic collection of TFP data on a national basis. The collection of such data would inform benchmarking undertaken in relation to the current building block method as well as provide opportunities for TFP trials and simulations on a national basis. Information derived from this analysis would also inform the policy development process and provide for a more transparent discussion of the advantages and disadvantages of the TFP approach vis-à-vis the building block and other approaches, and the likely outcomes for regulated businesses and customers under the TFP approach.

Data requirements

As noted in the AER's 20 August 2008 submission to the AEMC regarding the Victorian Government's TFP rule change proposal, the AER considers that the effective development and implementation of a TFP approach is critically dependent on the collection of robust, consistent and reliable long term data about network costs and operational parameters, from a broad range of network businesses.

Currently, data available for Australian transmission networks is more limited than that available for distribution networks, while the amount and quality of data available for distribution networks is variable across jurisdictions. The AER understands that the Essential Services Commission of Victoria (ESCV) is the only Australian utility regulator that has collected TFP data in a structured and systematic manner, although this data applies only to electricity and gas distribution networks.

The AER agrees that data availability over an extended period will significantly assist implementation of TFP in whatever form it is used. The AER considers that the sample period should cover at least two regulatory periods and analysis should have regard to the nature of the business cycle during the period and whether the period corresponds with a steady state or step change in network investment. The AER has been consulting with industry and other stakeholders on the development of a regulatory information order (RIO) setting out a nationally consistent framework for annual information reporting by electricity distribution businesses. The RIO will set out guidance and protocols underlying the annual collection of information. The AER will use the information collected to assist in the assessment of future regulatory proposals by electricity distribution businesses. In developing information instruments for electricity distribution and other network businesses in the energy sector, the AER will have regard to policy developments concerning the future use of TFP and any related amendments to the NER or NGR.

Regarding the specification of outputs and inputs for TFP calculations, often the specification will be designed to fit with the dataset available. While this can result in a workable TFP estimate, the methodology may lose some accuracy and robustness. At a minimum, the information required to develop a TFP trend should include: number of customers, total volume of energy delivered, peak demand, revenue (from total energy delivered and peak demand), operating expenditure, depreciation and additions to plant and equipment, and input costs.

Definitions for outputs and inputs that are accepted by stakeholders and applied transparently and consistently to data collection and analysis are key to a workable and robust TFP framework. Consistent with generally accepted data collection and analysis practices, any 'clean up' of data should encompass standardised, widely accepted quantitative methods of

data cleansing for the purpose of more rigorous analysis. This does not include manipulation or transformation of data in response to unexpected or seemingly unreasonable results.

In the use of TFP as an informative tool to assist the assessment of efficient costs, it may be necessary to benchmark regulated Australian businesses against each other in deriving not only industry-wide TFP growth but also relative efficiency performance of the businesses. If businesses vary greatly in their relative efficiency level, then the scope for productivity growth may differ across these businesses. The efficient costs of the regulated business under consideration should account for its potential for moving towards the industry frontier to the extent that the gap is not due to exogenous factors that are out of control of the business. This would inevitably require more comprehensive data than the basic output and input data used for measuring TFP.

It may be also desirable to benchmark regulated Australian businesses against overseas businesses in addition to, and independent of, domestic TFP benchmarking. Where Australian data is considered unsuitable for measuring TFP, the additional information derived from international benchmarking is likely to also provide value as an information tool and for qualified comparative reporting. The rationale for adding overseas businesses to a data sample is often due to a lack of comparable domestic comparators. This is unlikely to be the case for the Australian energy sector where there are a large number of networks. However, the number of businesses in each industry sub-sector (i.e. electricity/gas and distribution/transmission) would need to be considered given the potential for businesses in a small sub-sector to influence the benchmarking process. This is less likely the more businesses there are in the industry sample, which emphasises the need for a sample that is appropriate in size and not limited by providing businesses with the ability to opt out of TFP regulation.

Role of the X factor in incentives

In discussions generally about the possible use of TFP, there is a potential for some misunderstanding about the role of the X factor in CPI-X regulation. The AER raises this issue in the context of the potential use of TFP to set the X factor under a building block approach.

The power of the incentive on a regulated business to improve productivity depends on the extent to which prices/revenues can be 'de-linked' from the business's own costs (as the AEMC's Framework and Issues Paper states). Put another way, the power of the incentive on a regulated business to improve productivity depends to a large degree on two factors:

- the length of the regulatory period; and
- the information taken into account by the regulator at the time of the next regulatory determination – and specifically, the extent to which the regulator, in setting the future allowed revenue, relies on estimates of the regulated business's own costs (as opposed to the costs of some other real or hypothetical business).[3]

[3] Assuming that the regulated prices are not updated or adjusted in the light of the business's cost out-turns during the regulatory period – or, put another way, the length of the regulatory period is the length of time between reviews of the business's own costs.

A TFP approach would increase the power of the incentive to improve productivity if either (a) it allowed the use of longer regulatory periods; or (b) it allowed the regulator to place less weight on cost information provided by the regulated business and greater weight on cost information drawn from other sources (such as the costs of other real or hypothetical businesses).

The impression can be given in debates over TFP that its primary use is to set the X factor in a regime which allows prices or revenues to evolve according to CPI-X during the regulatory period. This suggests that the primary benefit of TFP – enhancing incentives for productive efficiency – arises when TFP is used to set the X factor.[4]

However, it is worth noting that the level of the X-factor in a CPI-X regime, in itself, has no necessary impact on the incentives on the regulated business. The power of the incentive to improve productivity depends on the extent to which prices/revenues can be de-linked from costs. The setting of the X-factor, in itself, has no impact on that linking or de-linking.

This can be seen in the current regulatory arrangements. As the Framework and Issues Paper points out, clause 6.5.9 of the NER requires the X-factor to be used to smooth the revenue over the regulatory control period, while ensuring that the net present value (NPV) of the total revenue over the regulatory control period is constant. The total revenue allowed to the regulated business (in NPV terms) is completely independent of the X-factor. Under the current regime, the X-factor could be set equal to an industry-wide TFP or any other number and it would result in no significant change to the incentives created under the regime. It would potentially have a minor impact on the smoothness of the path of prices/revenues over time but would otherwise have no effect on incentives. The only way to increase the power of the incentive to reduce costs is to either lengthen the regulatory period or change the process for resetting the revenue/prices at the end of each regulatory period. For example, instead of the regulated business's own cost information, the regulator, in resetting the business's revenue at the end of the regulatory period, might rely entirely on the cost information obtained through some form of bottom-up model of a regulated business[5] or the cost out-turn information obtained from other comparable businesses in the industry, such as through some form of benchmarking.

There may be a role for TFP or other productivity measures, in this process, to assess the relative performance of different businesses. If it were determined that there was a clear need to increase the power of the incentive to improve productivity, these are the kinds of alternatives that could be considered. TFP might have a role to play, but it is just one of many options that should be considered.

Power of incentive to reduce expenditure

As noted previously, one of the perceived problems associated with the current building block approach concerns the strength of efficiency incentives that it provides for regulated

[4] For example, page 31 of the Framework and Issues Paper states that "The setting of an X factor based on forecast efficiency improvements using TFP growth estimates would represent a significant change to the current arrangements".

[5] This approach is used by the ACCC in regulating Telstra's wholesale prices. That process makes use of a computer model of a hypothetical replacement network known as Telstra's "PIE II" or (more recently) "TEA" model.

businesses. On this matter, it is noteworthy that there are a number of papers in the economics of regulation which come to the view that very high-powered incentives to reduce expenditure are not necessarily preferred.[6] That is, moving to a regime in which the link between the regulated business's prices/revenues and costs is broken entirely may not be efficient, for several reasons:

- High-powered incentives expose the regulated business to more risk and, consequently, are less likely to be sustainable – that is, such arrangements are more likely to be renegotiated when the regulated business is making substantial apparent profits or losses.
- High-powered incentives for some desirable objectives without corresponding incentives on other desirable outcomes distort the regulated business's efforts to the detriment of overall welfare. In particular, high-powered incentives to reduce costs may induce the regulated business to cut back on service quality or investment. In addition, incentives to inefficiently substitute between capital expenditure and operating expenditure may arise.
- High-powered incentives to reduce expenditure give rise to strong incentives on the regulated business to manipulate the information it provides and contest the decisions of the regulator.

A fundamental question for the AEMC's review, therefore, is whether there is a need to significantly increase the power of the current incentive under the building blocks approach to reduce expenditure. This is an issue that could be explored as part of the review in the consideration of the appropriate form and use of a TFP methodology.

[6] See Schmalensee, Richard, (1989), "Good Regulatory Regimes", Rand Journal of Economics, 20(3), Autumn 1989, 417-436; Lyon, Thomas, (1996), "A Model of Sliding-Scale Regulation", Journal of Regulatory Economics, 9, 1996, 227-247; Baumol, William J., (1982), "Productivity Incentive Clauses and Rate Adjustment for Inflation", Public Utilities Fortnightly, 22 July 1982, 11-18.