Mr John Pierce
Chairman Australian Energy Markets Commission
PO Box A2449
Sydney South NSW 1235

08 January 2011

Dear Mr Pierce,

Response to Australian Energy Market Commission Draft Report on the use of Total Factor Productivity

Energeia is pleased make this submission to the AEMC on its draft report into the use of Total Factor Productivity (TFP) for the determination of prices and revenues[1]. We apologise for this response being submitted after the AEMC's deadline but note that this response has required significant analysis work to be undertaken.

The AEMC is commended for holding the TFP workshop on 29 November 2010, in which modelling of the impact of TFP on utility prices was presented to participants for a number of scenarios. The Economic Insights model provides comparative information, which is valuable in assessing the appropriateness of using TFP.

Energeia has the following concerns with the suitability of the TFP approach that the AEMC has chosen:

- The output measures chosen for the analysis do not reflect the outputs of a DNSP. In particular, the use of energy transported as an output is not appropriate. The DNSPs output has capacity and distance components and would be much better represented as kVA or kVA.km;
- The inherently historical bias of the TFP approach will lead to outcomes that cannot reflect emerging factors, which are not captured by TFP. We feel this is a particularly topical issue in the face of rapid technological change, e.g. distributed energy resources.

In addition, Energeia is concerned that the chosen modelling scenarios are restrictive and not representative of real-life conditions. For example the "unanticipated increase in output" scenario does not increase the DNSP's capex in the event of the growth spurt this scenario is intended to represent.

In order to better demonstrate the potential outcomes of a TFP approach Mr. Harry Colebourn, Energeia's Senior Advisor – Regulation and Engineering has enhanced the AEMC's model by the addition of Monte-Carlo testing, in which forecast inputs were assigned probabilistic values and the financial outcomes were logged and charted.

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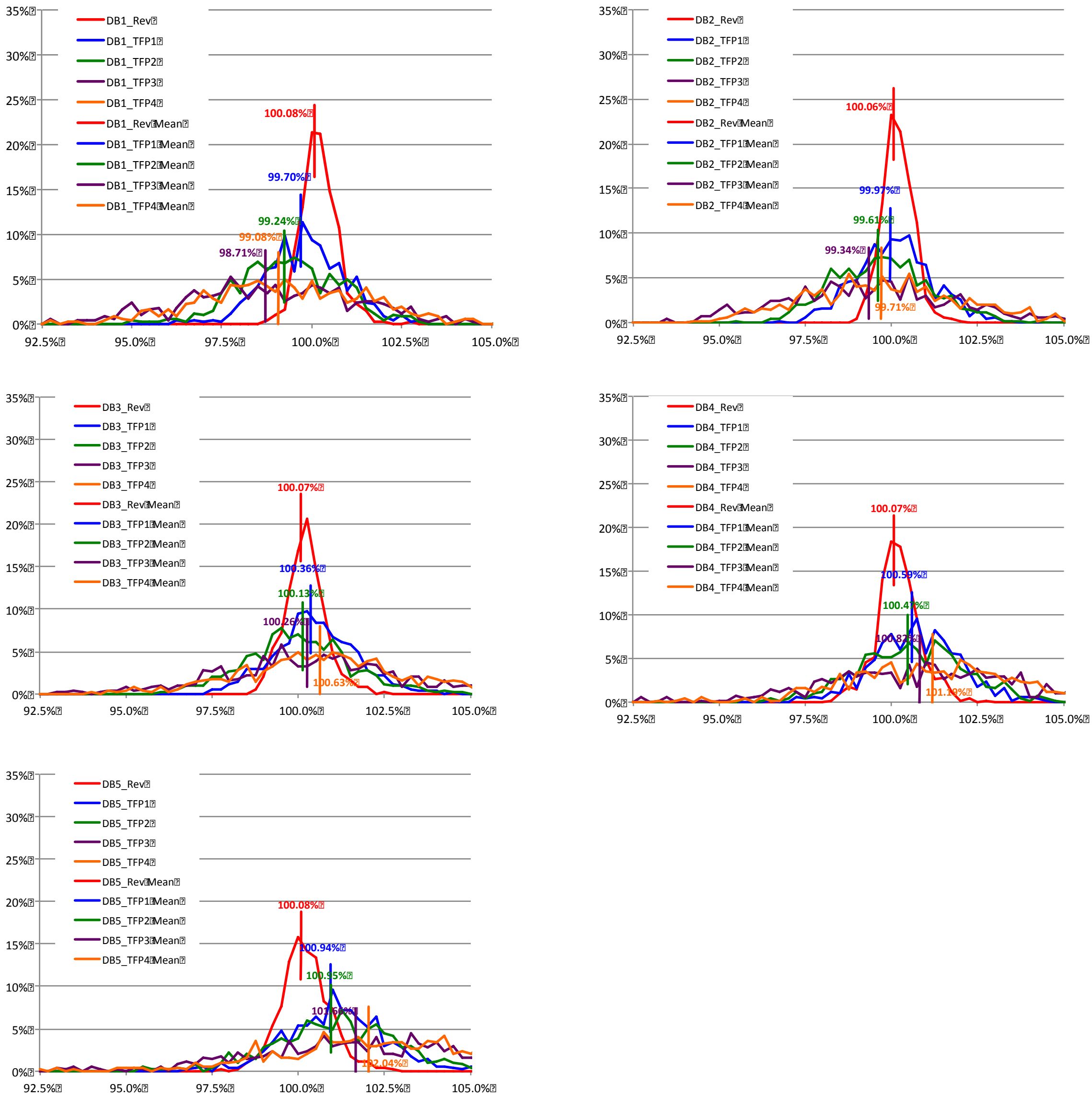
1 Australian Energy Market Commission, Review into the use of total factor productivity for the determination of prices and revenues, 12 November 2010.

The major assumptions that Energeia employed for its forecast parameters are set out in the Attachment.

Figure 1 illustrates Energeia's findings, comparing the output of the "Building Blocks Case 1 – best review-time forecasts" with the four TFP based outputs[2]. In each case, the revenue output is the NPV over the period from year 11 to year 25, divided by the NPV of revenue from the Building Block Case 1 with standard growth assumptions.

Figure 1 – Monte Carlo revenue outcomes for DBs 1-5



2 Denis Lawrence and John Kain, Model of Building Blocks and Total Factor Productivity-based Regulatory Approaches - AEMC Workshop, 29 November 2010.

The observations that Energeia would make from the above charts is that:

- In every case, the TFP approach produces a significantly greater divergence in revenue outcomes than the building block approach, in effect leading to a greater revenue risk for the DNSP; and
- The TFP approach also appears to lead to systematic differences, which can disadvantage or advantage a particular DNSP. DNSPs 1 and 2 have worse outcomes than DNSPs 3, 4 and 5.

Energeia further extended the model to include the realistic scenario of introduction of a carbon price. The model assigned probabilities to the date of introduction and the level of the carbon price, as set out in the Attachment. The effect on energy consumption and demand was modelled using the long-term price elasticity of demand. The outcome of this modelling is shown for DNSP1 in Figure 2. The other DNSPs displayed similar divergence from the outcomes in Figure 1.

Figure 2 – Introduction of carbon price, DNSP1

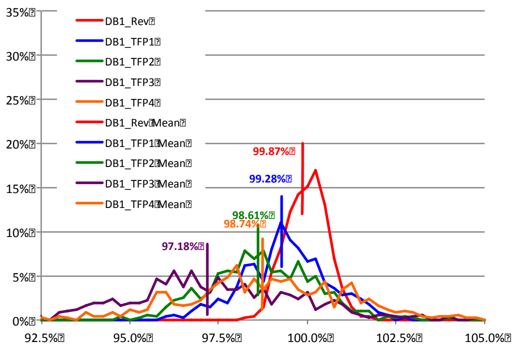


Figure 2 clearly illustrates that TFP would lead to a significant shortfall in revenue to sustain this DNSP. This arises from two issues:

- Historically based TFP options cannot adequately cater for an event such as the introduction of a carbon price. The intention with TFP was that it would provide a ‘set and forget’ approach to regulation, but it would be no better in this regard than the building block approach in requiring some form of off-ramp or intervention; and
- The inappropriate choice of ‘energy transported’ as an output measure infers a loss of productivity (and loss of revenue) in the event of an energy decrease due to an externally imposed increase in bundled electricity prices, or the rapid take up of energy efficiency schemes or distributed energy resources.

Please do not hesitate to contact Harry Colebourn on 0412 328 549, or me, if we can be of any further assistance to the AEMC in this matter. Energeia would be pleased to work with the AEMC and its consultants to further refine this analysis as necessary, to ensure that participants are fully informed on the nature of the AEMC’s proposal and its consequences.

Yours sincerely,

Ezra Beeman
Managing Director, Energeia

Attachment – Principal Monte Carlo Forecast parameters assumed for TFP analysis

Energy forecast	Has the same mean as the base case scenario and has a normal distribution. The standard deviation of the normal distribution was scaled to provide negative growth on average on one year in ten.			
Cyclical variation in forecasts	Each successive year is based on 60% of the prior year outcome.			
Demand forecast	Has the same mean as the base case scenario and has a normal distribution. The standard deviation of the normal distribution was scaled to provide negative growth on average on one year in ten.			
Energy-demand correlation	Demand forecast is correlated by 80% with the energy forecast.			
Capex requirement	Capex variation with demand assumes 40% of the total program is growth related. Capex is lagged by one year in the event of demand increase and two years in the event of demand decrease.			
Opex requirement	Opex variation with demand assumes 40% of the total program is growth related. Opex is lagged by one year in the event of demand increase and two years in the event of demand decrease.			
Carbon price level	$/MWh	$15.00	$20.00	$25.00
	Probability	33.3%	33.3%	33.3%
Carbon price introduction	Year	12	13	14
	Probability	25%	40%	35%
Price elasticity of demand	-0.3, scaled in over a period of 5 years			

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