



Draft findings on LRMC

IPART electricity retail review – public forum

25 January 2007

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Terms of Reference

The Terms of Reference require IPART to consider two aspects of energy costs:

- the LRMC of generation plant
- the cost of purchasing energy from the market

In relation to LRMC, the Terms of Reference require consideration of:

“an allowance for electricity purchase costs based on an assessment of the long-run marginal cost of electricity generation from a portfolio of new entrant generation to supply the load profile of customers remaining on regulated retail tariffs”

“an allowance based on long run marginal cost for retailer compliance with any Commonwealth mandatory renewable energy target (MRET) requirements and the licence requirements relating to the NSW Greenhouse Gas Benchmark Scheme, which takes in to account price and volume”

Approach to estimating LRMC

There are two broad approaches to estimating LRMC:

- stand-alone load – this approach assumes there is currently no plant available to serve the load, and prices an entirely new least cost mix of plant
- incremental load – this approach assumes there is existing plant available, and prices the least cost way of adding to the existing mix of plant

The stand-alone load approach tends to lead to higher estimates of LRMC because it is typically cheaper to expand existing plant than it is to build new 'greenfield' plant.

We consider that the stand-alone approach is most consistent with the Terms of Reference.

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WHIRLYGIG

WHIRLYGIG is used to estimate the LRMC of electricity generation.

WHIRLYGIG is used as a long-term electricity investment model:

- it provides the optimal (least-cost) mix of investments and operation patterns to meet demand for electricity:
 - optimal size, type, location, timing and operation of supply and demand options
- it optimises total costs (fixed + variable), using mixed integer programming techniques

WHIRLYGIG includes a number of constraints, including:

- greenhouse targets (technology specific, cap & trade)
- limits on the availability of certain supply and demand options
- project lead times
- system reserve requirements
- lumpy investments

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Plant cost assumptions

Plant cost assumptions are a key input into *WHIRLYGIG*.

We have used plant costs from a publicly available report commissioned by NEMMCO (the ACIL report):

- the NEMMCO plant costs were based on assumed capacity factors – we determined the implied fixed and variable components to allow WHIRLYGIG to optimise the capacity factor
- we used costs for coal, OCGT and CCGT plant in NSW



LRMC results – energy costs

Year	Country Energy	Energy Australia	Integral Energy
2007/08	\$39.0	\$45.3	\$45.7
2008/09	\$39.2	\$45.5	\$46.1
2009/10	\$39.1	\$45.6	\$45.3

This energy cost measures:

- the demand weighted average cost of new non-renewable generation
- plus the cost of meeting the reserve constraint
- divided by each retailer's average MWh of use

Differences between the LRMCs for each retailer are driven by load shape.



LRMC results – green costs

<i>Year</i>	<i>MRET</i>	<i>GGAS</i>	<i>NRET</i>
2007/08	\$1.1	\$2.6	\$0.4
2008/09	\$1.4	\$3.0	\$0.6
2009/10	\$1.7	\$3.5	\$0.9

The green cost is estimated on the basis of incremental cost: that is, based on costs of meeting the greenhouse schemes taking into account the emission rates of the current stock of plant.

The estimated LRMC of meeting the NRET scheme may vary depending on the final design of the scheme and its implementation.



Breakdown of LRMC

The recommended LRMC is broken down into peak, shoulder and off-peak components, using the retailer's definitions of these periods.

Costs are decomposed in the following way:

- by allocating all variable costs to each respective period
- by allocating half-hourly capacity costs of plant required for energy production to each respective period
- by allocating remaining capacity costs to each period according to the relative scarcity of capacity





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Draft findings on market-based energy costs

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- the LRMC of generation plant
- the cost of purchasing energy from the market

In relation to market-based energy costs, the Terms of Reference require:

“recognition that ETEF will cease operation within the determination period”

“recognition of hedging, risk management and transaction costs faced by retailers in the absence of ETEF”

“recognition of the forecasting risks faced by retailers in the absence of the ETEF”

Approach to estimating market-based energy costs

With ETEF rolling off, retailers are exposed to energy purchase risk.

Our approach to market-based energy costs reflects this:

- considers the trade-off between energy purchase costs and risks
- is based on portfolio optimisation theory, which provides a robust framework for evaluating the trade-off
- determines efficient frontiers, which describe the portfolios of assets (energy purchasing options) that provide the lowest risk for a given level of return



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STRIKE

STRIKE determines an efficient frontier for energy purchasing:

- no lower-cost mix of products can be achieved for the same risk
- no lower risk can be achieved for the same cost

The efficient frontier is dependent on:

- characteristics of the current and forecast customer load, including volatility
- characteristics of spot prices, including forecasts of the spot price over the review period
- characteristics of the available hedging instruments, including forecasts of the price of contracts available over the review period



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Forecast prices

A key input into *STRIKE* is forecast spot and contract prices.

Our analysis uses four sets of forecast prices:

- each standard retailer provided forecasts of peak and off-peak spot prices, as well as peak and off-peak swap and cap prices
- we forecast peak and off-peak spot prices, as well as peak and off-peak swap and cap prices

For each retailer and for each year, these four sets of forecast prices are used to estimate an efficient frontier – so for each of the three retailers and for each year, we estimate four efficient frontiers.

These frontiers provide a range for energy costs.

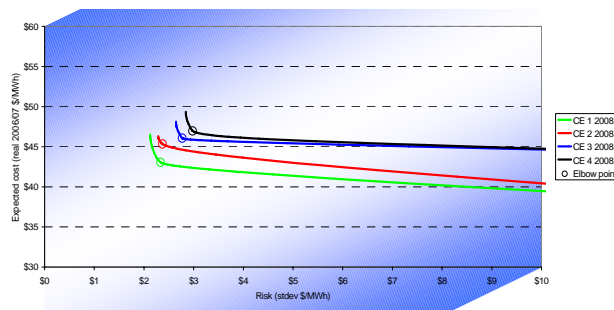
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Conservative and elbow points – example

Each point on the efficient frontier represents an efficient mix of hedging contracts, given the load shape and the forecast prices.

In recommending a range for energy costs we concentrate on two points:

- the conservative point (least risk)
- the elbow point



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Results

	Year	Country Energy	EnergyAustralia	Integral Energy
Conservative point	2007/08	\$46.3 to \$49.4	\$53.2 to \$56.1	\$55.0 to \$57.7
	2008/09	\$43.3 to \$48.5	\$49.6 to \$55.1	\$51.1 to \$56.7
	2009/10	\$42.0 to \$46.4	\$48.1 to \$53.4	\$49.6 to \$54.8
Elbow point	2007/08	\$43.1 to \$47.0	\$49.3 to \$53.3	\$50.7 to \$54.6
	2008/09	\$41.5 to \$44.3	\$47.6 to \$52.3	\$49.4 to \$53.7
	2009/10	\$39.3 to \$44.3	\$45.1 to \$50.6	\$46.8 to \$51.6

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Breakdown of market-based energy costs

The recommended range for market-based energy costs is broken down into peak, shoulder and off-peak components, using the retailers' definitions of these periods.

Costs are decomposed in the following way:

- half-hourly spot load costs and contract difference payments are allocated to each respective period
- cap contract premiums are allocated on a pro-rata basis according to the value of the difference payments received in respect of the cap contract

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Draft findings on retail costs

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Terms of Reference

The Terms of Reference require consideration of “mass market new entrant retail costs”. A MMNE is defined as “a new market entrant that is of sufficient size to achieve economies of scale”.

Our interpretation of the MMNE is grounded by what is likely in practice:

- a large retailer operating elsewhere in the NEM, but without significant load in NSW
- a stand-alone electricity retailer
- a retailer that is not vertically integrated into distribution or generation

Methodology

A MMNE faces two broad categories of retail costs:

- the costs of acquiring new customers
- the operating costs of retailing to customers

MMNE retail costs estimated using two approaches:

- bottom-up approach – standard retailers provided information in relation to both the costs of acquiring customers and the operating costs of retailing
- benchmarking – in particular, against other regulatory decisions

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Customer acquisition costs

The range for customer acquisition costs is based on:

- the total cost of acquiring a new customer
- amortised over the expected life of a customer
- at a discount rate of 8 per cent

The total cost of acquiring a new customer is based on estimates provided by the standard retailers.

The expected life of a customer is based on:

- forecasts provided by the standard retailers
- rates of customer churn observed in a variety of markets

The discount rate is based on:

- previous decisions by IPART and ESCOSA
- comparable firm analysis

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Retail operating costs

The range for retail operating costs is based on:

- information provided by the standard retailers
- benchmarked against information from other jurisdictions

Standard retailers provided historic and forecast data on retail operating costs and customer numbers:

- forecast data reveals unexpected relationships between changes in fixed and variable costs over the forecast period and changes in customer numbers over the forecast period
- greater weight is therefore given to historic data from retailers

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Results

Range for customer acquisition costs:

- \$25 to \$30 per residential customer per annum for each year from 2007/08 to 2009/10
- \$40 to \$45 per business customer per annum for each year from 2007/08 to 2009/10

Range for retail operating costs:

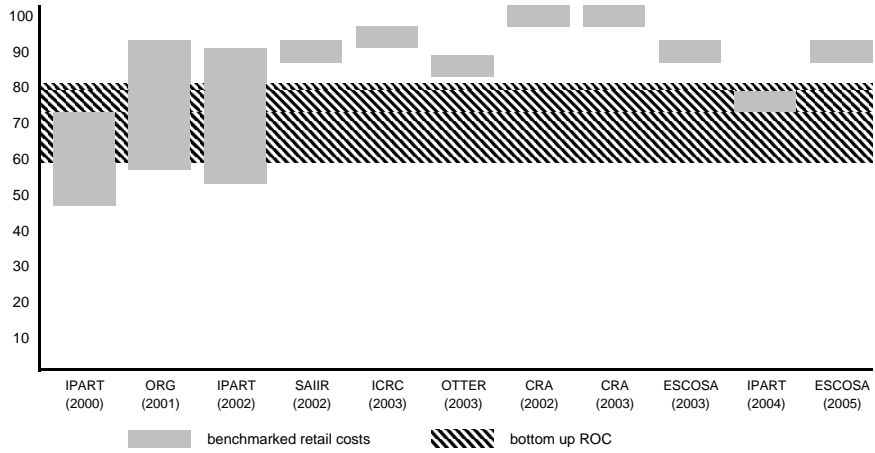
- \$60 to \$80 per customer per annum for each year from 2007/08 to 2009/10

Range for MMNE retail costs:

- \$85 to \$110 per residential customer per annum for each year from 2007/08 to 2009/10
- \$100 to \$125 per business customer per annum for each year from 2007/08 to 2009/10

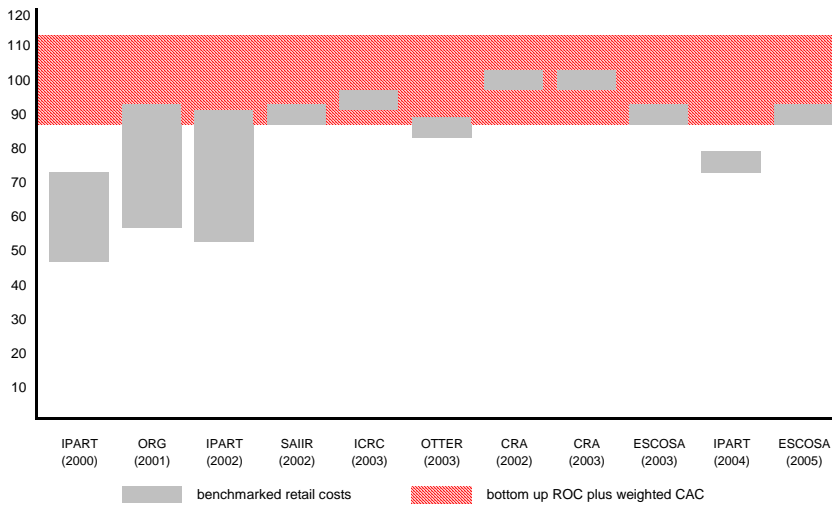
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Benchmarking



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Benchmarking



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Draft findings on retail margin

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Overview

The Terms of Reference require consideration of “mass market new entrant retail margin”.

We use three approaches to determining the appropriate retail margin:

- bottom-up approach
- expected returns approach
- benchmarking

Results converge to suggest an appropriate retail margin in the range 4% to 6%.

Bottom-up approach

1. Assess a retailer's real EBITDA, based on information from standard retailers:

- implies a retail margin in the range 4.1% to 4.8%

2. Integral/NERA propose build-up of elements of margin:

<i>Assumption / Contribution to margin</i>	<i>Low</i>	<i>Medium</i>	<i>High</i>
WACC	6 %	8 %	10 %
Working capital	1 Month	1 Month	1 Month
Contribution of working capital	0.5 %	0.7 %	0.8 %
Contribution for asymmetric risk	1 %	2 %	3 %
Contribution for return on physical assets	0.5 %	0.7 %	0.8 %
Contribution for return of physical assets	0.8 %	0.8 %	0.8 %
Total	2.8 %	4.2 %	5.4 %

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Expected returns approach – overview

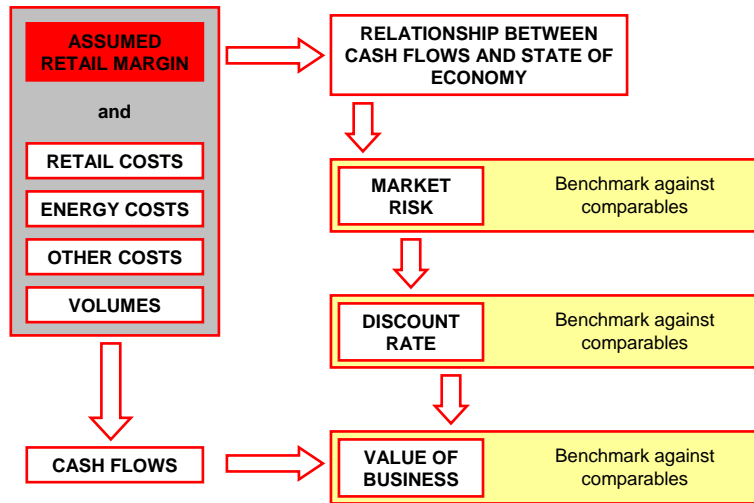
Expected returns approach tests the reasonableness of retail margins against market data from comparable businesses. The return must simply provide reasonable compensation for the risk that is borne.

The approach is as follows:

- for an assumed retail margin, estimate:
 - cash flows to the MMNE
 - the relationship between these cash flows and the state of the economy
- these imply a range of indicators for the MMNE, including:
 - market risk
 - discount rate
 - value of business
- each of these can be benchmarked against comparables to test the reasonableness of the assumed retail margin
- iterate this approach until the assumed retail margin is tested as reasonable

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Expected returns approach – overview



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Expected returns approach – risks

The retail businesses face a number of different risks that must be considered and quantified:

- **Energy purchase price** – quantified using *STRIKE*. Benchmark strategy involves substantial hedging, which reduces the quantum of this risk
- **Volume risk** – non-systematic (weather-related) over very short term. More systematic over longer term. Quantified via regression analysis examining changes in electricity volumes and GDP
- **Estimation risk** – quantified via scenario analysis to examine impact of changes in key parameters such as customer acquisition costs, energy costs, discount rate, volume variability, etc

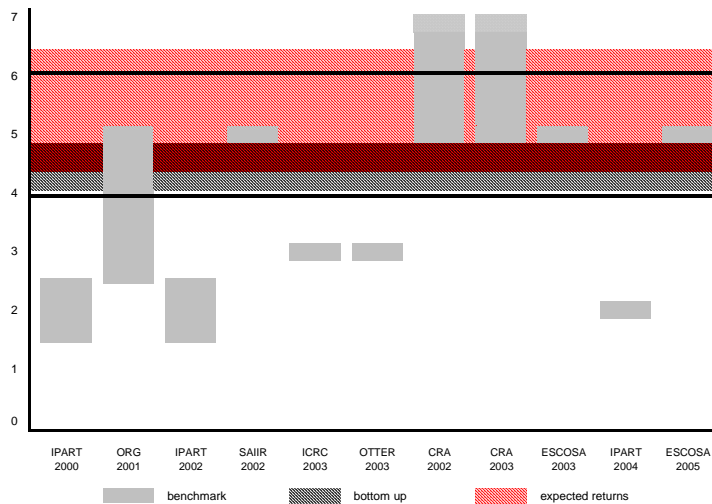
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Expected returns approach – results

	Low	Base	High
EBITDA margin = Revenue minus all costs except depreciation (energy, network, operating, customer acquisition, NEM fees):			
% sales	4.4%	5.2%	6.4%
\$m	37	44	55
\$/MWh	7.48	8.91	11.11
\$/Customer	42	49	62
Valuation metrics assuming zero expected volume growth:			
Value (\$m)	430	536	723
Value (\$/Customer)	477	595	803
Book-to-market assets ratio	0.55	0.74	0.92
Book-to-market equity ratio	0.33	0.60	0.88

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Summary of results



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