Guideline
Methodology for estimating foregone revenue

Network Demand Management Consultation Working Group

1 Introduction

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) currently regulates pricing for electricity distribution services in NSW under the National Electricity Code. On 11 June 2004, the Tribunal released a final report (the “report”) and final determination (the “determination”) in relation to network pricing over the period 1 July 2004 to 30 June 2009.

The report and determination set out actions and decisions designed to provide incentives for *network* demand management. These decisions include:

- introducing a D-factor into the weighted average price cap (WAPC) control formula to allow the distribution network service providers (DNSPs) to recover, amongst other things, foregone revenue as a result of non-tariff-based demand management activities
- establishing a working group on the calculation of distribution foregone revenue as a result of demand management activities.

As noted in its determination, the Tribunal considers that demand management offers significant advantages; in particular, it has the potential to relieve some network constraints and reduce the peakiness of the demand for electricity. The Tribunal’s demand management incentives are targeted at measures which produce these outcomes.

The determination includes definitions for non-tariff demand management measures and foregone revenue. However, the principles and methodology for calculating foregone revenue are not defined. Given the current limited experience of the type of demand management projects that might occur during the 2004-09 regulatory period, the Tribunal considered that a precise methodology for calculating foregone revenue should not be specified. Instead, a set of broad principles to guide DNSPs in calculating foregone revenue should be established.

Therefore, in October 2004 the Tribunal established a demand management consultation group to develop principles and guidelines on a number of matters, including the principles for calculation of foregone revenue.

The Tribunal may up date this guidelines from time to time and it will consider what information it will make available to the public as projects are assessed and approved under the D-factor (subject to data confidentiality constraints).

2 Purpose and scope of guideline

This guideline has been prepared to facilitate implementation of the D-factor demand management arrangements and, in particular, to provide clarity for DNSPs and demand managements service providers in respect of the Tribunal’s assessment and approval of *foregone revenue* under the determination.

The guideline is limited to the principles and methodology for estimating foregone revenue associated with non-tariff demand management measures in the context of the determination and the D-factor adjustment.

As revenue is affected by *quantity* and *price* of units sold, the guideline considers principles for estimating foregone revenue based on these components, that is:

- the amount of energy, demand or capacity affected by the non-tariff demand management measures
- the price/tariff applicable to the foregone energy/demand/capacity.

The guideline is structured as follows:

Table 1 – Structure of guideline

Ref	Section	Details
3	Context	Provides information and extracts from the determination and final report that significantly affect the principles and approach to calculating foregone revenue and this guideline
4	Issues considered	Summarises a number of points raised and issues considered in the course of developing the guideline
5	Principles	Sets out the principles for calculating foregone revenue for the purposes of section 11.3 of the determination. In some cases, further guidance is given on parameters related to/affecting foregone revenue
6	Examples	Provides examples of three different types of non-tariff demand management measure and illustrates how foregone revenue could be calculated in relation to each
7	D Factor approval process – foregone revenue	Summarises key elements of the approval process related to foregone revenue
8	Implementation process	Discusses the application of the foregone revenue guideline

3 Context

In developing the broad principles and approach set out in this guideline, the demand management consultation group explicitly considered key contextual issues, including the following:

- broader objectives for demand management and the depth of analysis undertaken through various inquiries and consultant reports
- WAPC regulatory framework for network pricing and the role of the D-factor mechanism
- practical issues associated with metering, measurement and estimation of the effect of demand management measures on demand, consumption and capacity
- regulatory principles such as proportionality and materiality, including the objective of ensuring that the costs associated with implementation do not outweigh potential benefits

- potentially short period for application of the D-factor and foregone revenue incentives, given the time lag for "pass-through" of costs to prices
- practical issues associated with determining the appropriate price to be applied when calculating revenue.

The following sections summarise key points in the determination and report relevant to this guideline, provide a high level description of the current "commercial" arrangements for demand management projects and set out the nature of current demand management projects.

3.1 Tribunal's determination and final report

The Tribunal's determination and final report on NSW Electricity Distribution Pricing 2004/05 to 2008/09 set out the Tribunal's decisions associated with providing incentives for network demand management.

Extracts of the determination and final report of particular relevance to this guideline are set out in Table 2 and Table 3 respectively (see section 7 for the Tribunal's approval process).

Table 2 – Determination references

Reference	Details
Annexure 1- Definition of Non-Tariff Demand Management Measures and Foregone Revenue	**Non-Tariff Demand Management Measures** means any action, project or activity undertaken by or on behalf of a DNSP, either independently or in conjunction with any other persons (such as generators, retail suppliers, energy service intermediaries and end-use customers), with the objective of reducing the costs of providing Prescribed Distribution Services by altering the level or pattern of consumption of energy, the source of energy, or the use of the DNSP's Distribution System, but excluding: (1) Tariff Demand Management Measures; and (2) any activities which expand the Distribution System or its capacity or which renew, repair or maintain it. **Foregone Revenue of a DNSP** for any Year means any revenue (from Prescribed Distribution Services provided by the DNSP) which: (1) has not been recovered by the DNSP in that Year; and (2) would in all likelihood have been recovered by the DNSP in that Year, but for the Non-Tariff Demand Management Measures undertaken by or on behalf of that DNSP.

Table 3 – Final report references

Reference	Details
8.3.3 DNSPs can recover revenue forgone as a result of non-tariff-based demand management activities	The Tribunal has decided to allow DNSPs to recover revenue foregone as a result of non-tariff-based demand management activities. The recovery of this foregone revenue is subject to Tribunal approval of the estimated amount. Where a demand management project results in reductions in revenue that extend beyond the end of that project, the DNSP may apply to recover the foregone revenue each year after the end of the project, up until the end of the regulatory period. The Tribunal recognises that accurately calculating the amount of revenue foregone as a result of demand management will be difficult. Many factors affect energy consumption levels, and the impact of demand management cannot be

Reference	Details
	precisely separated from the impact of other factors. However, it considers the direct assessment approach recommended by its consultant, SKM, is an appropriate method. With the direct assessment approach, the DNSP estimates the impact of a particular project on the level of demand/consumption in its area of operation, and provides quantitative evidence to support this estimate. Both the Tribunal and the DNSPs have limited experience of the type of demand management projects that might occur during the 2004-09 regulatory period. The Tribunal therefore considers it is not appropriate to specify a precise methodology for calculating foregone revenue, but to allow the DNSPs to submit their estimates and methodologies to it for assessment. However, it does consider it appropriate to establish a set of broad principles to guide DNSPs in calculating foregone revenue. These broad principles could include the following: ▪ there should be a well-defined group of customers whose consumption is impacted by the demand management project ▪ the link between the demand management project and affected customer should be documented ▪ estimates should be made with reference to quantitative estimates of reductions in volumes — for example, based on reduction in metered consumption, reductions in number of appliances, hours or time of use of machinery etc ▪ estimates may be derived with reference to a sample of affected customers — a full audit of customers is not required.

3.2 SKM's final report November 2003

The Tribunal's final report refers to the direct assessment approach set out in the SKM report "Avoided distribution costs and congestion pricing for distribution networks in NSW", November 2003.

Table 4 – SKM references

Reference	Details
SKM report – page 87 - direct assessment method	Estimating directly from DM projects implemented. This method relies on direct evaluation of the consumption volume impacts of the DM projects that have resulted in lost revenues. DNSPs making payments or incentives to encourage DM projects should be estimating the expected impacts on demand, and then evaluating actual impacts (at least for a sample number of projects) in order to determine that DM has been effective in reducing demand and hence deferring capital. To extend this evaluation to include energy and other components that contribute to lost revenues should not be a significant additional burden, and could be included as a requirement on 3rd parties implementing DM measures for DNSPs under contract. A range of estimates can be used, such as those conducted as part of energy audits or proposals for DM projects, benchmarking energy and demand for DM participants, or independent assessments can be used (the methods contained in the Demand Side Abatement methodology for the NSW Greenhouse Gas Abatement Scheme might be used as a guide and adapted to calculate demand as well as energy impacts).

The following points summarise the context for SKM's discussion on the direct assessment approach and are relevant to the principles set out in this guideline.

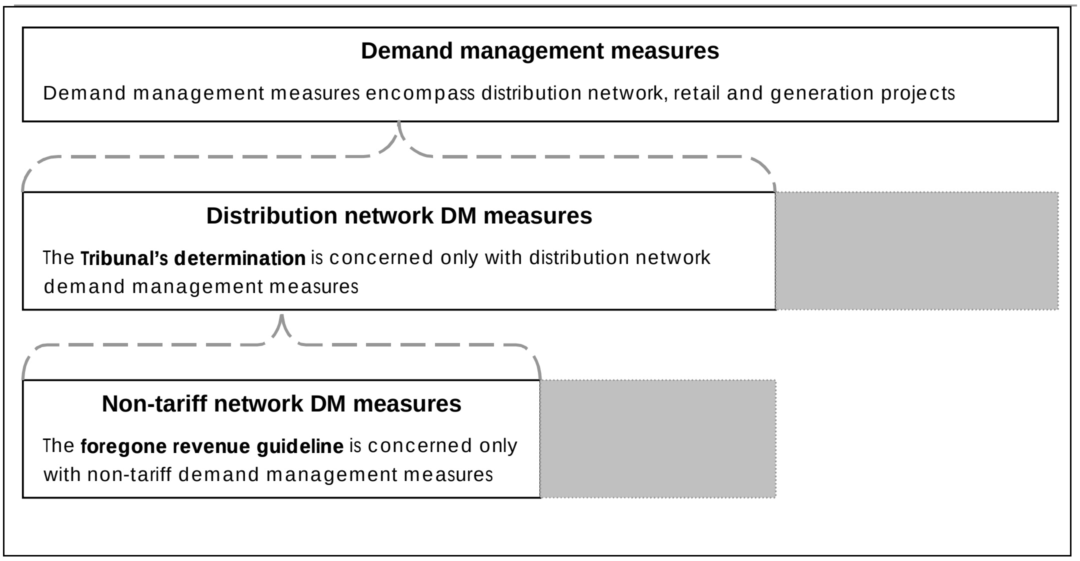
1. SKM noted that the size of the demand management impact on various consumption components (energy, demand and capacity, including time of use splits where appropriate) must be estimated in order to calculate lost revenues. Because the impact of demand management is always relative to a "without demand management" case that cannot be measured, determining the impact will always require an estimate or calculation of assumed impacts.

2. SKM considered four options for calculating or estimating the demand management impacts on consumption volumes. SKM noted that each of the methods suffers from some shortcomings and none can ever be 100 per cent accurate. SKM recommended adoption of the direct assessment or the avoided distribution cost proxy method as the preferred option.

3.3 Nature of current demand management projects

This guideline applies to the calculation of ***foregone revenue for any non-tariff demand management measure*** related to the network; as illustrated in Figure 1 below, non-tariff demand management measures are a subset of the broader range of network demand management measures, which, in turn, are a subset of the full range of demand management measures.

Figure 1 – Non-tariff demand management measures are a subset of demand management measures



In developing the principles, the demand management consultation group sought to understand the nature and diversity of current and contemplated future non-tariff network demand management projects.

The following "classifications" of non-tariff network demand management projects indicates the potential range of measures for which foregone revenue may need to be calculated under the D-factor arrangements.

- Specific or targeted projects, typically relating to a small number of large customers, often undertaken under contract with a demand side management service provider. These projects are estimated to account for more than 80 per cent of current network demand management projects.
- Broad or system wide projects, typically targeting a region (or regions) (rather than a customer), may involve different types of customers. The projects could be focussed on a particular end use, such as lighting or water heating. However, as with targeted projects the DNSP must establish a clear link between the demand management measure and a reduction in network expenditure for a project to be approved under the D-factor.

3.4 Commercial arrangements

The commercial arrangements for development and operation of network demand management projects vary; these arrangements affect the information associated with measurement and verification of demand management outcomes.

The range of commercial arrangements associated with network non-tariff demand management measures includes the following:

- **Projects undertaken by a third party demand management service provider under contract with the DNSP.** The third party undertakes to deliver a certain demand management outcome (specified by location, kWh reduction, kVA reduction, kW reduction) over a certain time-period. The DNSP undertakes to pay the third party for delivery of these outcomes. How the demand management service provider achieves the demand reduction is largely up to the demand management service provider and generally reflects its particular skills and expertise.
- **Projects undertaken by DNSP.** The DNSP designs and implements the project using in-house resources. The “target” design outcomes are considered as part of the project approval. The project delivery is monitored as part of standard project delivery and monitoring processes.
- **Projects designed by DNSP but implemented by third party.** The DNSP designs the project; approval occurs on the same basis as DNSP projects. The DNSP may contract a third party to provide expert assistance in implementing the project.

While many current projects are based on the first arrangement (third party demand management service providers), the enhanced demand management incentives are not designed to favour any one commercial arrangement over another. However, as stated above for a project to be approved under the D-factor DNSPs will need to demonstrate how the demand management project targets a network constraint or peak demand.

4 Issues considered

4.1 Economic effect of foregone revenue recovery

The D-factor arrangements provide for recovery of foregone revenue in addition to recovery of non-network demand management costs. This enhances the attractiveness of demand management projects.

4.2 Pragmatism, materiality and workability of principles

There is a risk that the administrative cost of the DNSPs collecting and providing information, and of the Tribunal assessing the information and approving amounts for foregone revenue could exceed the resulting benefit or incentive. The principles need to take account of materiality and the quantum of aggregate compensation effected by the measure. The principles also need to contemplate the limited experience of parties in demand management and the need for evolution.

That said, the Tribunal must ensure that customers are not being asked to pay more than they should and if a project receives funding via any other demand management fund or through the NSW Greenhouse Gas Abatement Scheme the costs cannot also be recovered via the D-factor.

4.3 Adjusting volumes for other factors such as changes in weather

As noted in the final report, a number of factors affect energy consumption, demand and capacity and the impact of demand management measures cannot be precisely separated. Further, the relative effect of these other factors depends on the nature of the measure; for example, some measures (such as energy consumption and demand) are strongly affected by temperature. Other demand management measures are not affected by weather, but would be affected by economic growth.

In developing the guideline, the demand management consultation group sought to balance the need to ensure that significant distortions or effects from other factors were separated/corrected for, but that where the factors created noise and no significant effect, separation was not necessarily required. As a result, the guideline requires that these matters be considered by the DNSP and that the information provided to the Tribunal should set out the rationale for the DNSP's decision to adjust/not adjust for other factors.

4.4 DUOS prices

In estimating foregone revenue, the price associated with a foregone volume/demand/capacity needs to be considered. In the context of the D-factor, the price needs to reflect the foregone revenue associated with the distribution network only. That is, the price should reflect the distribution use of system (DUOS) prices and components of prices relating to the retail, generation and transmission effects should be excluded.

4.5 Date of price and quantity estimates

Under the D-factor regime, the Tribunal assesses and approves estimates of the expected avoided distribution costs. However, for foregone revenue the Tribunal is not assessing and approving the expected foregone revenue but estimates of the actual foregone revenue. As stated in the determination:

"details of the basis for those estimates (including any assumptions underlying them) and demonstrating that the methodology used to calculate foregone revenue does give rise to a reasonable estimate of the actual amount of foregone revenue[1]"

Therefore, the quantity estimates provided by the DNSP should be of the actual foregone revenue resulting from the implementation of the non-tariff-based demand management measure. The actual foregone revenue can only be known *ex post*; hence why the Tribunal will assess the recovery of foregone revenue on a retrospective basis.

The Tribunal recognises that in some instances the DNSPs will only be able to provide estimates of actual foregone revenue given the difficulty in precisely calculating the impact of a demand management measure and the need to adjust for other factors such as weather. However, the Tribunal will require the DNSPs to provide information which demonstrates that their methodology used to calculate foregone revenue is a reasonable estimate of the actual foregone revenue. In some cases the Tribunal may request that the DNSP provide an independent assessment that its methodology to estimate foregone revenue is providing reasonable estimates of actual foregone revenue.

DNSPs will only be allowed to recover actual foregone revenue; that is, unless the DNSPs incurs a reduction in its revenue as the direct result of implementing a non-tariff-based demand management measure it will not be able to recover any foregone revenue from customers.

As outlined below, foregone revenue occurs as a result of a change in quantities to which a value is attributed. If the DNSP foregoes revenue as a result of implementing a non-tariff-based demand management measure in year t-1, the relevant price is the tariff that would have applied to that affected quantity in year t-1.

5 Principles

The estimation of foregone revenue resulting from a non-tariff-based demand management measure should reflect the following principles:

1. Foregone revenue (FR) occurs as a result of a change in quantities to which a value is attributed; the calculation should separately identify the foregone quantity estimate (FQ) and the price estimate (P).

   FR = P*FQ[2]

2. The foregone quantities may include energy consumption, energy demand and/or capacity. In addition, the quantities may relate to a specific time-period such as peak, off peak, or shoulder. Estimates of foregone quantities should be provided consistent with the relevant tariff structure.

3. The non-tariff-based demand management measure should be aimed at a clearly identified target quantity reduction ie that quantity reduction such as energy demand which the measure is targeted at delivering (which may be different to the estimated actual quantity reduction calculated *ex post*). The target quantity reduction for the non-tariff demand management measure should be identified as part of the DNSP's approval and design of the measure.

[1] See section 11.1 of the Tribunal's 2004 network pricing determination.

[2] Both in year t-1 but the estimate of quantity could only been finalised after year t-1 when the actual foregone revenue can be calculated.

4 In estimating foregone revenue, the estimated actual quantities foregone should be compared with the targeted change in quantities. The estimation process should consider the need to adjust for other factors, including any highlighted through this comparison.

5 The DNSPs must demonstrate the link between the implementation of the non-tariff-based demand management measure and the resulting estimated actual foregone energy quantum. The Tribunal may require the DNSP to provide independent expert evidence which verifies this link.

6 The estimates of "foregone" energy quantities may be derived with reference to a representative sample. If a sample is used the Tribunal will require the DNSP to submit independent verification that it provides a reasonable estimate of actual foregone revenue. If the non-tariff demand management measure is being implemented and managed through an energy performance contract[3] (or similar) the measurement and verification processes associated with the contract may be suitable as a basis for estimation.

7 The estimates of prices to be applied to respective quantity estimates should be based on the appropriate tariff applying at the time the quantity was foregone. That is, if the DNSP implemented a non-tariff-based demand management measure in year t-1 which resulted in the DNSP foregoing revenue in year t-1 the relevant price is that tariff which would have applied to that foregone quantity in year t-1.

8 If the non-tariff demand management measure is targeted at a specific customer or project, the actual DUOS tariff applying to that customer or project should be used to estimate the foregone revenue.

9 If the measure affects quantities associated with more than one tariff, the price can be estimated based on actual quantities or appropriate weightings. The basis for any weightings, in the case of a weighted average tariff, needs to be demonstrated as being appropriate for the purposes of estimating foregone revenue.

10 The approach used to estimate the change in quantities and estimated price should be consistent (for example, the same approach and assumptions should be used for weighting etc).

6 Examples

The details of calculating the estimate of foregone revenue will vary considerably between projects. The following examples have been developed to indicate the range of projects which may give rise to foregone revenue and to provide examples of how foregone revenue could be estimated in each case.

6.1 Energy efficiency light bulb demand management program

This example is a non-tariff demand management project which involves the installation of energy efficient light bulbs. The project is undertaken by the DNSP.

[3] An energy performance contract is an agreement between an energy user and a third-party contractor, where the third-party contractor guarantees (via contract) to lower the amount of energy used by the customer by implementing energy efficiency upgrades.

Two issues should be noted when considering this example:

- As stated in the introduction to these guidelines, the Tribunal's demand management incentives are targeted at measures which reduce network expenditure. When assessing whether a project would qualify for consideration under the D-factor, the Tribunal will require the DNSP to demonstrate how the measure would reduce network expenditure for example by addressing network constraints or reducing the peakiness of demand. The DNSP could provide evidence of a network constraint by referencing its network performance report or a report demonstrating that substations in an area were in excess of their firm ratings.
- A number of retailer schemes are currently in place which provide funding for projects similar in nature to this example. When assessing the reasonableness of the estimates of foregone revenue for such a project, the Tribunal would seek formal confirmation from the DNSP that it has not received funding through other schemes for the project.

Table 5 – Example of forgone revenue for an energy efficient light bulb demand management project targeting a regional or specific network constraint

Assumptions:

1 50,000 bulbs were given to customers during the campaign targeted at reducing peak demand or a well documented network constraint – the Tribunal would require the DNSP to verify these facts through an independent report

2 Audit/historical evidence showed that 80% of bulb recipients actually installed the bulb – a copy of the audit would need to be provided to the Tribunal

3 The programme was targeted at domestic customers in areas where peak network constraints had been identified

a) 80% of all Domestic customers are on an inclining block tariff and 70% of these customers have consumption in the second block in any given billing period

b) The remaining 20% of Domestic customers are on a Time of Use tariff

4 The energy efficient light bulbs have a 15W rating compared to 60W for the average incandescent

5 The average household uses at least 2 light household light fixtures for an average of 4 hours per day

6 The average use of lighting is between 6:30pm and 10:30pm

7 No one customer was allocated more than 2 bulbs

8 DUOS Component in ToU tariff

a) Peak Rate = 10c/kWh

b) Shoulder rate = 2c/kWh

c) Off Peak rate = 0.5c/kWh

9 DUOS Component of the Anytime Energy tariff = 4c/kWh (Step 1) & 5c/kWh (Step 2)

10 Peak (Working Weekdays WWD 2pm-8pm), Shoulder (WWD 7am-2pm, 8pm-10pm), OP (WWD 12am-7am, 10pm-12am, Weekends & Pub Hols)

Method 1: Calculate average tariff and apply to total volumes Average energy reduction per bulb per year = (60W-15W)* 4hrs *365 days = 65.7kWh Number of bulbs = 40,000 (ie 50,000*0.8) Total energy = 40,000 *65.7 = 2,628,000 kWh Average tariff: ▪ For the ToU tariff on weekdays, 37.5% of consumption reduction is in Peak (6:30pm-8pm), 50% in Shoulder (8pm-10pm) and 12.5% in Off Peak (10pm-10:30pm) Therefore the average TOU week rate is (0.375*10 + 0.5*2 + 0.125*.5) = 4.8125c/kWh ▪ For ToU tariff on weekends & public holidays the average rate is 0.5c/kWh The anytime energy tariff / ToU tariff split is 80/20, there are 113 weekend and pub hols in a year ▪ Therefore the average tariff is (0.8*0.7*5 + 0.8*0.3*4 + 0.2*113/365*0.5 + 0.2*252/365*4.8125) = 4.4555 c/kWh **Total forgone revenue** = 2,628,000 kWh * 0.044555 $/kWh = $117,090 p.a
Method 2: Apply volumes to individual or groups of tariffs ** (Note that this approach is more useful for tariffs with demand and capacity components) ▪ Forgone revenue on anytime energy tariff: = 0.8 * 0.7 * 50,000 * 0.8 * 65.7kWh * 0.05$/kWh + 0.8 * 0.3 * 50,000 * 0.8 * 65.7kWh * 0.04 $/kWh = $98,813 ▪ Forgone revenue Peak component of ToU tariff: = 0.2*50,000 * 0.8 * 65.7kWh * 0.375 * 0.10 $/kWh*252/365 = $13,608 ▪ Forgone revenue Shoulder component of ToU tariff: = 0.2*50,000*0.8*65.7kWh *0.2*0.05 $/kWh *252/365 = $3,629 ▪ Forgone revenue Off-Peak component of ToU tariff: = 0.2*50,000*0.8*65.7kWh *0.125* 0.005 $/kWh *252/365 + 113/365*0.2*500,000*0.8*65.7kWh*0.005 $/kWh = $1,040 **Total forgone revenue =** $98,813 + $13,608 + $3,629 $1,040 = $117,090 p.a

6.2 Customer-specific measure with metered quantities

This non-tariff demand management project involves investment related to a specific customer and site. The project is undertaken by the DNSP and affects peak demand, shoulder demand and peak energy. It is aimed at reducing peak demand.

Table 6 – Example of forgone revenue for a specific customer and site

XYZ Manufacturing

Assumptions:
1. DM measure reduces peak energy by 10%, shoulder and off peak energy by 5% and peak demand by 20%.
2. DM impact for full 12 months ie DM program starts 1 July of second year
3. DUOS tariff:

Peak (c/kWh)	0.5
Shoulder (c/kWh)	0.39
Off Peak (c/kWh)	0.01
Demand ($/kVA)	4.75

Estimation of Change in Quantities

Effect of non-tariff demand management measure on customer consumption and demand

		Before DM	After DM
July	Peak (kWh)	73,450	66,105
	Shoulder (kWh)	155,270	147,507
	Off Peak (kWh)	218,480	207,556
	Demand (kVA)	1,230	984
August	Peak (kWh)	74,560	67,104
	Shoulder (kWh)	157,210	149,350
	Off Peak (kWh)	219,040	208,088
	Demand (kVA)	1,310	1,048
September	Peak (kWh)	72,830	65,547
	Shoulder (kWh)	154,870	147,127
	Off Peak (kWh)	217,830	206,939
	Demand (kVA)	1,240	992
October	Peak (kWh)	73,150	65,835
	Shoulder (kWh)	154,980	147,231
	Off Peak (kWh)	218,220	207,309
	Demand (kVA)	1,250	1,000
November	Peak (kWh)	72,810	65,529
	Shoulder (kWh)	152,360	144,742
	Off Peak (kWh)	217,430	206,559
	Demand (kVA)	1,230	984
December	Peak (kWh)	72,450	65,205
	Shoulder (kWh)	153,810	146,120
	Off Peak (kWh)	218,050	207,148
	Demand (kVA)	1,250	1,000
January	Peak (kWh)	72,940	65,646
	Shoulder (kWh)	153,670	145,987
	Off Peak (kWh)	217,160	206,302
	Demand (kVA)	1,230	984
February	Peak (kWh)	72,850	65,565
	Shoulder (kWh)	153,220	145,559
	Off Peak (kWh)	217,230	206,369
	Demand (kVA)	1,220	976
March	Peak (kWh)	73,980	66,582
	Shoulder (kWh)	154,760	147,022
	Off Peak (kWh)	219,160	208,202
	Demand (kVA)	1,280	1,024
April	Peak (kWh)	74,550	67,095
	Shoulder (kWh)	154,840	147,098
	Off Peak (kWh)	218,420	207,499
	Demand (kVA)	1,250	1,000
May	Peak (kWh)	74,690	67,221
	Shoulder (kWh)	155,890	148,096
	Off Peak (kWh)	219,320	208,354
	Demand (kVA)	1,270	1,016
June	Peak (kWh)	73,260	65,934
	Shoulder (kWh)	155,130	147,374
	Off Peak (kWh)	218,670	207,737
	Demand (kVA)	1,230	984

Estimation of Foregone Revenue

Effect of non-tariff demand management measure on revenue

		Before DM	After DM
July	Peak (kWh)	$ 367.25	$ 330.53
	Shoulder (kWh)	$ 605.55	$ 575.28
	Off Peak (kWh)	$ 21.85	$ 20.76
	Demand (kVA)	$ 5,842.50	$ 4,674.00
August	Peak (kWh)	$ 372.80	$ 335.52
	Shoulder (kWh)	$ 613.12	$ 582.46
	Off Peak (kWh)	$ 21.90	$ 20.81
	Demand (kVA)	$ 6,222.50	$ 4,978.00
September	Peak (kWh)	$ 364.15	$ 327.74
	Shoulder (kWh)	$ 603.99	$ 573.79
	Off Peak (kWh)	$ 21.78	$ 20.69
	Demand (kVA)	$ 5,890.00	$ 4,712.00
October	Peak (kWh)	$ 365.75	$ 329.18
	Shoulder (kWh)	$ 604.42	$ 574.20
	Off Peak (kWh)	$ 21.82	$ 20.73
	Demand (kVA)	$ 5,937.50	$ 4,750.00
November	Peak (kWh)	$ 364.05	$ 327.65
	Shoulder (kWh)	$ 594.20	$ 564.49
	Off Peak (kWh)	$ 21.74	$ 20.66
	Demand (kVA)	$ 5,842.50	$ 4,674.00
December	Peak (kWh)	$ 362.25	$ 326.03
	Shoulder (kWh)	$ 599.86	$ 569.87
	Off Peak (kWh)	$ 21.81	$ 20.71
	Demand (kVA)	$ 5,937.50	$ 4,750.00
January	Peak (kWh)	$ 364.70	$ 328.23
	Shoulder (kWh)	$ 599.31	$ 569.35
	Off Peak (kWh)	$ 21.72	$ 20.63
	Demand (kVA)	$ 5,842.50	$ 4,674.00
February	Peak (kWh)	$ 364.25	$ 327.83
	Shoulder (kWh)	$ 597.56	$ 567.68
	Off Peak (kWh)	$ 21.72	$ 20.64
	Demand (kVA)	$ 5,795.00	$ 4,636.00
March	Peak (kWh)	$ 369.90	$ 332.91
	Shoulder (kWh)	$ 603.56	$ 573.39
	Off Peak (kWh)	$ 21.92	$ 20.82
	Demand (kVA)	$ 6,080.00	$ 4,864.00
April	Peak (kWh)	$ 372.75	$ 335.48
	Shoulder (kWh)	$ 603.88	$ 573.68
	Off Peak (kWh)	$ 21.84	$ 20.75
	Demand (kVA)	$ 5,937.50	$ 4,750.00
May	Peak (kWh)	$ 373.45	$ 336.11
	Shoulder (kWh)	$ 607.97	$ 577.57
	Off Peak (kWh)	$ 21.93	$ 20.84
	Demand (kVA)	$ 6,032.50	$ 4,826.00
June	Peak (kWh)	$ 366.30	$ 329.67
	Shoulder (kWh)	$ 605.01	$ 574.76
	Off Peak (kWh)	$ 21.87	$ 20.77
	Demand (kVA)	$ 5,842.50	$ 4,674.00
		$ 83,110.44	$ 68,054.16

Foregone revenue	**$ 15,056.28**
Peak (kWh)	**$ 440.76**
Shoulder (kWh)	**$ 361.92**
Off Peak (kWh)	**$ 13.10**
Demand (kVA)	**$ 14,240.50**

6.3 High voltage customer with kVA tariff – power factor correction project

This non-tariff demand management project is targeted at improving the power factor at a customer's site. The example concerns a HV customer with a base load and part seasonal cooling pattern. Before such a project was approved under the D-factor, the DNSP would need to demonstrate to the Tribunal the link between the demand management measure and a reduction in network expenditure. The Tribunal will generally require the DNPS to provide an independent experts report validating this link.

It is assumed that the kWh consumption will not alter from the customer's perspective as a result of correcting the power factor.

Table 7 – Example of forgone revenue for high voltage customer

							Customer savings		DNSP foregone revenue	
							$ NUOS demand savings		$ DUOS demand savings	
	kVA Maximum demand			Power factor	kVAR correction required		TLD ($7.2131/kVA/mth)		TLD ($5.82/kVA/mth)	
Month	**Existing**	**0.9 PF corrected**	**1.0 PF corrected**	**@ exist max dmd**	**0.9 PF corrected**	**1.0 PF corrected**	**0.9 PF**	**1.0 PF**	**0.9 PF**	**1.0 PF**
Jul-03	399.72	364.80	328.32	0.8214	68.99	228.00	$251.88	$515.02	$203.23	$415.55
Aug-03	448.75	399.47	359.52	0.8012	94.44	268.56	$355.49	$643.62	$286.83	$519.32
Sep-03	469.05	424.93	382.44	0.8154	86.35	271.56	$318.22	$624.73	$256.76	$504.07
Oct-03	552.46	490.00	441.00	0.7983	119.19	332.76	$450.53	$803.97	$363.52	$648.70
Nov-03	546.49	498.80	448.92	0.8215	94.23	311.64	$343.99	$703.78	$277.56	$567.86
Dec-03	574.73	516.93	465.24	0.8095	112.13	337.44	$416.89	$789.76	$336.38	$637.23
Jan-04	569.21	513.60	462.24	0.8121	108.30	332.17	$401.12	$771.59	$323.65	$622.57
Feb-04	551.02	497.33	447.60	0.8123	104.60	321.37	$387.25	$745.98	$312.46	$601.90
Mar-04	556.65	505.87	455.28	0.8179	99.79	320.28	$366.31	$731.19	$295.56	$589.97
Apr-04	527.94	471.73	424.56	0.8042	108.18	313.80	$405.42	$745.69	$327.12	$601.67
May-04	481.56	432.67	389.40	0.8086	94.73	283.32	$352.67	$664.76	$284.56	$536.37
Jun-04	403.42	353.20	317.88	0.7880	94.45	248.39	$362.24	$617.01	$292.28	$497.84
							$4,412.01	**$8,357.10**	**$3,559.90**	**$6,743.05**

7 D-Factor approval process

7.1 The Tribunal's determination

Table 8 sets out extracts from the determination on the Tribunal's process for determining the amount of foregone revenue for inclusion in the D-factor for a particular year.

Table 8 – Determination approval process

Reference	Details
Section 11.1, annual submission of demand management information	On or before the first of February immediately prior to submitting its Annual Pricing Proposal to the Tribunal for each Year of the Regulatory Control Period under clause 12 (the Year t+1 for the purposes of this clause 11), each DNSP must submit to the Tribunal the following information: (a) a detailed description of any Non-Tariff Demand Management Measures, undertaken by the DNSP during the Year t-1 including (for each measure) its characteristics, the capital expenditure and operating costs to be deferred as a result of the measure and any reasonable alternatives to the measure; ….. (e) reasonable estimates of each of the following: (1) the DNSP's Foregone Revenue for the Year t-1, resulting from the Non-Tariff Demand Management Measures referred to in clause 11.1(a) and from any such measures occurring in any prior Years of the Regulatory Control Period; … (f) details of the basis for those estimates (including any assumptions underlying them) and demonstrating that the methodology used to calculate Foregone Revenue does give rise to a reasonable estimate of the actual amount of Foregone Revenue and is consistent with any guideline published by the Tribunal from time to time; ….
Section 11.2, Assessment and approval by the Tribunal	(b) The Tribunal will assess whether the estimates of **Foregone Revenue** and Avoided Distribution Costs submitted by a DNSP under this clause 11 and the estimated amount submitted under clause 11.1(g) are reasonable, having regard (without limitation) to the information provided by the DNSP under this clause 11. (c) If the Tribunal considers that a cost or estimate provided under this clause 11 is incomplete, inconsistent or unsubstantiated in any way, then the Tribunal may request additional information or request that the DNSP revise and resubmit that cost or estimate. (d) If the Tribunal considers that the costs and estimates provided under this clause 11 are reasonable it will approve them by notice in writing issued to the DNSP. (e) If the Tribunal considers that any of the costs or estimates provided under this clause 11 are unreasonable then the Tribunal may approve (at its own discretion) alternative costs or alternative estimates (as the case may be) for the purposes of this clause 11.2.

7.2 Tribunal's assessment of foregone revenue

Clause 11.2 of the determination outlines the D-factor assessment and approval process. Under this process the Tribunal assesses whether estimates of foregone revenue submitted by the DNSP under clause 11 are reasonable, having regard to the information submitted by the DNSP. If the Tribunal considers that an estimate of foregone revenue provided under clause 11 is incomplete, inconsistent or unsubstantiated in any way, then the Tribunal may request additional information or request that the DNSP revise or resubmit that cost estimate.

In addition, clause 11.1 of the determination requires the DNSP to submit annual demand management information to the Tribunal. This information includes a detailed description of any non-tariff demand management measures undertaken by the DNSP, including for each measure: its characteristics; the capital expenditure and operating costs to be deferred as a result of the measure; and any reasonable alternatives to the measure.

Therefore, when assessing whether the estimates of foregone revenue are reasonable the Tribunal would expect a DNSP to demonstrate how the non-tariff demand management measure would lead to a reduction in network expenditure. The Tribunal would expect a DNSP to provide information demonstrating:

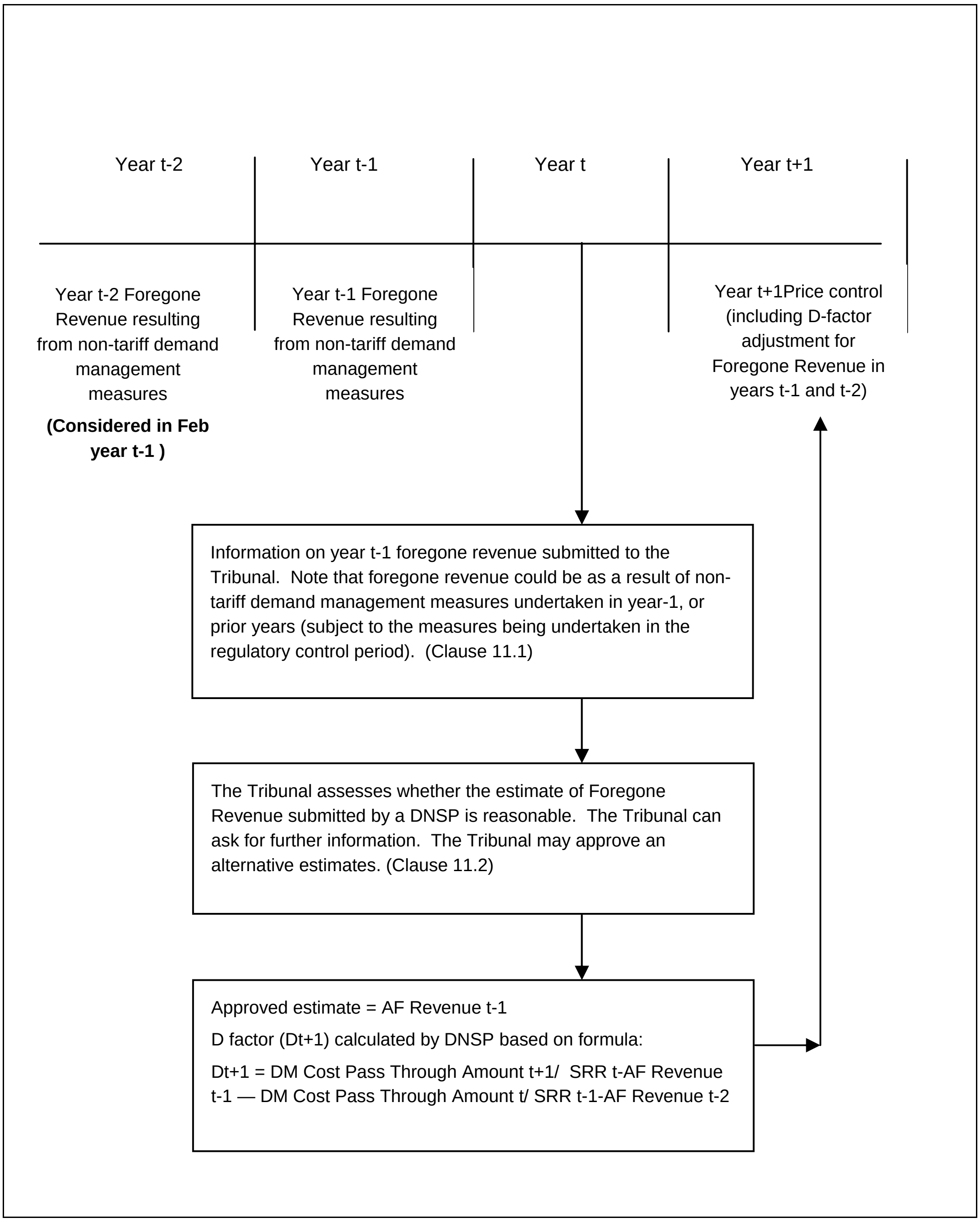
- a network constraint exists on its network; or
- the clear link between the network expenditure deferred or postponed and the non-tariff demand management measure implemented; and
- the cost of the network expenditure which would have taken place had the demand management measure not been implemented.

In assessing the reasonableness of the estimates of foregone revenue the Tribunal will generally require the DNSPs to provide independent verification that a network constraint exists, that the non-tariff demand management measure is targeted at reducing network expenditure and that the costs of the network expenditure deferred or postponed are reasonable. In most cases, the Tribunal would expect this independent verification to be an independent expert's report; that is, the report should be provided by an organisation which is independent of the DNSP, does not have a commercial interest in the outcome and is suitably qualified in the field of work.

The Tribunal will allow the cost of providing the independent expert's report to be included in the implementation costs for the measure and, assuming the measure is approved, the DNSP would be allowed to recover the costs from customers as long as the implementation costs did not exceed the avoided distribution costs.

7.3 Schematic of the Tribunal's approval process

The Tribunal's approval process for determining foregone revenue is set out in the figure below. As shown, D-factor adjustments are considered in year t for prices to apply in year t+1. The information on which D-factor adjustments are decided by the Tribunal is provided by 1 February in year t.


Year t-2
Year t-1
Year t
Year t+1
Year t-2 Foregone Revenue resulting from non-tariff demand management measures
(Considered in Feb year t-1)
Year t-1 Foregone Revenue resulting from non-tariff demand management measures
Year t+1Price control (including D-factor adjustment for Foregone Revenue in years t-1 and t-2)
Information on year t-1 foregone revenue submitted to the Tribunal. Note that foregone revenue could be as a result of non-tariff demand management measures undertaken in year-1, or prior years (subject to the measures being undertaken in the regulatory control period). (Clause 11.1)
The Tribunal assesses whether the estimate of Foregone Revenue submitted by a DNSP is reasonable. The Tribunal can ask for further information. The Tribunal may approve an alternative estimates. (Clause 11.2)
Approved estimate = AF Revenue t-1
D factor (Dt+1) calculated by DNSP based on formula:
Dt+1 = DM Cost Pass Through Amount t+1/ SRR t-AF Revenue t-1 — DM Cost Pass Through Amount t/ SRR t-1-AF Revenue t-2

7.4 An example of the Tribunal's approval process

The example in Table 9 considers the foregone revenue for a single project (DM1).

Table 9 – Foregone revenues approval and recognition in the 2004-09 regulatory period

		Regulatory period 2004-09				
Regulatory Year	t-2	t-1	t	t+1	t+2	t+3
Year		2004/05	2005/06	2006/07	2007/08	2008/09
Non-tariff demand management measure – Planning and estimation of foregone quantity and revenue						
Foregone revenue (FR) equals price (P) estimate by foregone quantity (FQ)	DNSP to estimate FQ (and FR) (DM1) for planning					
Non-tariff demand management measure – Actual foregone revenue						
Actual foregone revenue		$FR_{2004/05\ (t-1)}$	$FR_{2005/06\ (t)}$	$FR_{2006/07\ (t+1)}$	NA	NA
Applying for recovery of foregone revenue with non-tariff demand management measure						
Apply to the Tribunal for recovery of foregone revenue for non-tariff demand management measures for DM1			Apply Feb 06 for $FR_{2004/05\ (t-1)}$	Apply Feb 07 for $FR_{2005/06\ (t)}$	Apply Feb 08 for $FR_{2006/07\ (t+1)}$	NA
Approval by the Tribunal of FR			Approval of $FR_{2004/05\ (t-1)}$	Approval of $FR_{2005/06\ (t)}$	Approval of $FR_{2006/07\ (t+1)}$	NA
Recovery of foregone revenue through D-factor adjustment to prices						
D-Factor recovery				Adjust for $FR_{2004/05\ (t-1)}$	Adjust for $FR_{2005/06\ (t)}$	Adjust for $FR_{2006/07\ (t+1)}$
Reversal of previous year D-Factor recovery					"Back out" Adjust $FR_{2004/05\ (t-1)}$	"Back out" Adjust $FR_{2005/06\ (t)}$

8 Implementation process

8.1 Application of guideline

The guideline establishes principles for the Tribunal's assessment and approval of foregone revenue as part of the D-factor regime. The Tribunal will take this guideline into account when making decisions in accordance with the process set out in the determination. As shown in section 7 above, this means that the Tribunal considers foregone revenue (and will apply the guideline) on an *ex post* basis (i.e. foregone revenue in year t-1 is considered in year t for recovery in year t+1).

However, the DNSP's decision to proceed with a project occurs in advance, with the methodology used to estimate foregone revenue determined in advance of the project being implemented. The process for collection of information to support any measurement and verification will also generally be decided in advance of the measure being implemented (potentially up to two years before the Tribunal's formal consideration of foregone revenue).

While the Tribunal formally considers foregone revenue *ex post*, the demand management consultation group considered that there would be benefits in a DNSP being able to seek the Tribunal's advice on its proposed approach to estimating foregone revenue in advance of the non-tariff demand management project being implemented.

The Tribunal considered that to further promote demand management projects and increase investment certainty it is willing to provide a preliminary assessment on whether the DNSP's approach to estimating foregone revenue is reasonable prior to a project being implemented. Such an assessment would be at the DNSP's request and would provide an advance indication of the Tribunal's assessment on the reasonableness of the DNSP's approach to estimating foregone revenue within the context of the D-factor. However, this assessment would only be preliminary and would not constitute formal approval of the estimates itself as this occurs *ex post* during the D-factor process once <u>actual</u> forgone revenue can be calculated. It would, however, provide the DNSP with comfort that its approach was reasonable.

It should be noted that while the Tribunal may provide a preliminary *ex ante* assessment on the methodology to estimate foregone revenue, the approval of the estimates itself can only occur *ex post* and the estimates of actual foregone revenue which are known *ex post* may differ from the estimates calculated when the methodology is developed *ex ante*.

It should also be noted that by providing its preliminary assessment on the reasonableness of the DNSP's approach to estimating foregone revenue, the Tribunal is not providing *ex ante* approval of DNSP's investment decisions. The Tribunal maintains its previous advice that between price reviews it cannot provide binding decisions on whether particular investments would be rolled into the asset base at the time of the next review. The preliminary assessment provided by the Tribunal would only be provided in relation to the DNSP's estimates of foregone revenue resulting from non-tariff based demand management projects, in the context of the D-factor regime.

Therefore the approval of the estimates of foregone revenue is a two step process. First, the DNSP would submit its proposed approach to estimating foregone revenue to the Tribunal prior to a project being implemented. The Tribunal would then provide its preliminary assessment indicating whether the DNSP's proposed approach appears reasonable. This assessment would be provided prior to the project being implemented, but would be subject to the project going ahead. Second, if the project was implemented and the DNSP could demonstrate that it had foregone revenue as a result of the project, the DNSP would then submit its estimates of actual foregone revenue consistent with the D-factor process outlined in the determination - if the Tribunal approves the estimates in year t, prices would increase to recover the actual foregone revenue in year t+1. If the project was not implemented by the DNSP or the DNSP did not forego any revenue then there would be no increase in prices under the D-factor.