



LOCAL GOVERNMENT  
ASSOCIATION OF  
QUEENSLAND INC.

# Simplified Water Cross-Subsidy Guide

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## Cross Subsidy Guide – Accounting Treatment

### Background

The Local Government Act requires Councils to identify and disclose cross-subsidies between classes of water consumers. These cross-subsidies must be disclosed in the Annual Report. In addition to cross-subsidies, many of the concepts in this guide are useful in designing a two-part tariff.

This Guide is intended to supplement the 'Guidelines for Identification and Measurement of Cross-Subsidies' issued by the Department of Natural Resources (as it then was called) in September 1998. The DNR Guidelines were based on economic concepts. This Accounting Guide is aimed at providing accounting treatment of the economic concepts in the DNR Guidelines. Where there is any discrepancy, the DNR guidelines take precedence since they are referenced in the legislation. Although the legislation requires disclosure of water and sewerage cross-subsidies, it is understood that the Queensland Competition Authority will only require disclosure of Water cross-subsidies due to the impracticality of measuring most sewerage volumes. Therefore, this guide only provides an outline of the process to be applied for the provision of water services.

### Legislative Requirements

Local Government Act

**783(d)** cross-subsidies between classes of consumers and community service obligations in the provision of water and sewerage services are identified and disclosed;

Local Government Finance Standards

#### **115 Disclosure of cross-subsidies in annual report**

In its annual report, an entity must state the amount of cross-subsidies between the following classes of consumers, for water or sewerage services provided for the financial year—

- (a) domestic consumers;
- (b) commercial consumers;
- (c) industrial consumers;
- (d) another class decided by the entity;
- (e) other consumers.

#### **116 Identification and disclosure of cross-subsidies**

**(1)** For deciding the amount to be stated for section 115, the entity must, to the extent it is reasonably practicable, comply with the guidelines.

**(2)** In this section—

**“guidelines”** means the document called 'Guidelines for Identification and Measurement of Cross-Subsidies' issued by the Department of Natural Resources.

### Terminology

The DNR Cross Subsidy Guidelines centre around the concept of 'marginal cost'. This concept is based on economic theory and is not found in any Local Government accounting ledger. In simple terms, the marginal cost is the cost of producing another kilolitre of water. (i.e. the cost at the margin). This is different to the variable cost, which is a more common accounting term. Variable costs tend to be backward looking – looking at costs already incurred, whereas marginal costs tend to be forward looking – how much extra would be incurred if demand increases? For the purpose of simplifying the calculation and reporting of

this matter, this Guide suggests that the term ‘water consumption cost’ be used instead of ‘marginal cost’. Therefore, the term ‘Current Water Consumption Cost’ will be used instead of ‘Short Run Marginal Cost’ and the term ‘Total Water Consumption Cost’ will be used instead of ‘Long Run Marginal Cost’.

The DNR guidelines go further than simple marginal costs, and distinguish between the short-run marginal cost (SRMC) and the long-run marginal cost (LRMC). Generally, the short-run marginal cost just looks at the additional operating costs that would be caused by producing another kilolitre of water. The long-run marginal costs also take into account the cost of providing additional capacity in the system if many additional kilolitres are produced.

These concepts are important not only for identifying and disclosing cross-subsidies, but also in the design of a two-part tariff. The Local Government Act defines a “two-part tariff” as “a basis for a utility charge for water services consisting of access and consumption components with the objective of achieving efficiency and sustainability in the use of water”. The Department of Local Government and Planning Two-part Tariff Guidelines recommend basing the consumption component of the tariff on the LRMC, and argues that this best fits the definition of a two-part tariff under the Act. This makes more sense if the term ‘water consumption cost’ is used instead of marginal costs, since the water consumption component of the tariff would be based on the water consumption cost.

### **Costs included**

#### Short-term costs:

In most Local Government water systems, the following cost items are likely to increase with each additional kilolitre of water produced:

1. Bulk Water
2. Water treatment
3. Water pumping

However, each case needs to be examined on the circumstances involved as discussed below.

#### *Bulk Water*

Whether bulk water costs are included in determining the current water consumption cost depends on the terms of any agreement with a bulk supplier of water, or the nature of Council’s own water source. The terms of any bulk water agreement need to be examined to determine what additional cost will be incurred if Council increases its water usage. Any fixed component not related to volume purchased should be excluded from the current water consumption cost calculation. If Council has its own water supply source, the water consumption cost will only be the additional cost of producing extra water above that currently used. Generally this would only be related to any pumping and treatment costs.

It is possible for there to be no current water consumption cost for bulk water if, either the Council has its own water source which is gravity fed to the reticulation system, or the Council purchases water from a bulk supplier for a fixed cost.

### *Water Treatment*

The fixed cost of a water treatment plant is not included in the current water consumption cost, since the cost would not increase with usage. Therefore depreciation, equipment maintenance, labour and many materials would not be included. The main water treatment costs which vary with water usage levels would be for chemicals and electricity. In some cases it might be arguable that the water treatment costs increase during wet (low consumption) periods due to the poorer quality of water. In that case, only the treatment costs which are associated with usage would be included in the current water consumption cost. The cost of replacing filters would only be included if additional usage would require earlier replacement.

### *Water Pumping*

Generally, the only pumping cost that increases with usage would be electricity costs. Again, depreciation, maintenance, labour and many materials would not be included in the current water consumption cost.

To calculate the current water consumption cost, simply divide the total of these identified costs by the number of kilolitres used annually. This will show a cost per kilolitre as shown in the following example:

#### **Current cost of water consumed**

	<b>Fixed \$</b>	<b>Marginal \$</b>	<b>Total \$</b>
Bulk water operating/purchase costs	0	500,000	500,000
Water treatment costs	85,000	35,000	120,000
Water pumping costs	50,000	150,000	200,000
<b>Current water consumption cost \$</b>	<b>135,000</b>	<b>685,000</b>	<b>820,000</b>
No. Kilolitres consumed in the year		1,300,000	
<b>Current water consumption cost \$/kl</b>		<b>0.53</b>	

### Long-term costs

The primary long-term cost that needs to be added to the current water consumption cost is the future cost of augmenting the capacity of the system to cope with future demand. It is worth noting that, for the purposes of working out the longer-term costs, a yield or supply estimate should be used, not capacity. Yield is usually lower than capacity. The following steps are required to identify the cost of augmentation of the system.

1. Identify the cost to Council (i.e. excluding third party contributions – subsidies, developer contributions, etc) of storage, delivery, treatment or other capital costs, over a 10-20 year period. (This would normally be identified in the Total Management Plan (TMP))
2. Determine the Present Value (PV) of these capital expenditures using a 7 percent discount rate. (The DNR Guidelines also require sensitivity testing at 4% and 10%). Appendix 1 shows a present value table for \$1,000,000 at 4%, 7% and 10% over a 20-year period. Alternatively, the DLGP two-part tariff worksheet could be used, which has a present value calculator (see: [http://www.dlgp.qld.gov.au/corporate/publications/local\\_govt/water\\_tariffs/xls/two\\_part\\_tariff\\_spreadsheet.xls](http://www.dlgp.qld.gov.au/corporate/publications/local_govt/water_tariffs/xls/two_part_tariff_spreadsheet.xls) ).
3. Divide the PV cost by the additional annual water yield in megalitres (or kilolitres) to calculate a cost per megalitre or kilolitre. (Water infrastructure yields are often

expressed in terms of litres per second, reservoir capacity or bulk capacity. These will need to be converted to an estimated annual yield.)

4. Divide the present value per kilolitre by the number of years into the future before the augmentation is required.
5. Add the Net Present Value of the future operating costs, also on a per kilolitre basis. (This would include all of the additional future operating costs, including depreciation, cost of capital, labour, etc, not just the marginal costs used for the current water consumption cost.) These costs would be included for all years from the start date to the end of the 10-20 year period).

In some cases, the construction costs could be incurred well before the augmented facility has much usage. In those instances, it is reasonable to date the works (for purposes of calculating the present value) as being the year in which the mid-point in its yield will be used. For example, if a dam costing providing capacity for 20,000ML per year is expected to be built in 2005, but the volume used will not reach 10,000ML until 2010, then the date to be used for this expenditure would be 2010, and the yield shown would be 10,000ML rather than the longer term theoretical or design capacity.

The additional cost per kilolitre for the long-run system augmentation should be added to the current water consumption cost above to calculate the total water consumption cost. If there are no Council funded augmentation works planned for the next 10 – 20 years, then this step can be omitted and the total water consumption cost would be the same as the current water consumption cost.

#### Future Augmentation Costs

	Year	Council Funded \$	Contributed \$	Total \$
New Reservoir	2008	1,200,000	800,000	2,000,000
<b>Total augmentation</b>		1,200,000	800,000	2,000,000
Present value 7%		790,000		
Daily Yield		27ML		
Annual Yield		10,000ML		
Total additional cost/kl		0.08		
<b>Future augmentation costs (\$ per kilolitre)</b> (divide by number of years before the project is needed, eg 4 years)		<b>0.02</b>		

#### Future Operating Costs

	Year	Operating Costs p.a. \$
New Reservoir	2008	50,000
Net Present Value 2008-2013		180,000
Annual Yield		10,000ML
<b>Future operating costs (\$ per kilolitre)</b>		<b>0.02</b>

### Total Water Consumption Cost

The total cost of water consumed is simply the sum of the current cost of water consumed, plus the additional augmentation capital and operating costs, expressed as a cost per kilolitre. The following table shows the effect for the above example.

### Total Water Consumption Cost

	\$ per KI
Current water consumption cost	0.53
Future augmentation costs	0.02
Future operating costs	0.02
<b>Total Water Consumption Cost</b>	<b>0.57</b>

### Identifying and Reporting Cross-subsidies

The definition of a cross-subsidy under the DNR guidelines differs from the common use of the term 'cross-subsidy'. Most people consider a cross-subsidy to be a situation where one group of consumers pays more than another, however this is not necessarily a cross-subsidy under the DNR Guidelines and would be called price differentials. Under the DNR Guidelines, a cross-subsidy only occurs if one group is paying below the total water consumption cost (LRMC). In other words, a cross-subsidy is where one group is subsidising another group which is not even paying for the water consumption cost, let alone the fixed costs associated with the service. Another factor to consider in determining whether a cross-subsidy exists is that the DNR Guidelines not only attribute revenue from consumers in the calculation, but also include any additional operating grants, subsidies or Community Service Obligation (CSO) payments which are attributable to a particular sector. Therefore it is possible (and legally valid) for one consumer group to pay below the water consumption cost provided there is a valid CSO in place.

The following steps are required to identify any cross-subsidies:

1. Calculate the total revenue (base, consumption and excess charges less any discounts) for each consumer group – ideally residential, commercial, industrial and other (eg. Council and Community/Sporting groups).
2. Determine the volume of water supplied to each consumer group in the year.
3. Divide the results of these two figures to calculate the price per kilolitre each group was charged.
4. Make a similar calculation for any Government subsidies or CSO's
5. Complete the Cross Subsidy table as below:

Note that in the examples shown below, without the Community Service Obligation (CSO), the Residential Group would have been shown as receiving a cross-subsidy. Even though the CSO is a form of cross-subsidy, it is treated differently in the cross-subsidy guidelines because it is regarded as a valid subsidy. The value of CSO's per kilolitre is calculated in the same way as the revenue per kilolitre – by dividing the amount of the CSO for that consumer group by the total number of kilolitres of water used by the consumer group. The purpose of the Cross-subsidy Statement in the Annual Report is to demonstrate transparently the price

paid by each consumer group compared with the total water consumption cost, and whether any subsidies have been treated appropriately (eg by a CSO).

If any consumers are unmetered, and estimate of their consumption should be used to prepare the statement.

### Sample 1. Annual Report Cross-Subsidies Statement (No Cross-subsidies)

#### Water Cross Subsidies Statement (Simplified)

	Residential (cents per kilolitre)	Commercial (cents per kilolitre)	Industrial (cents per kilolitre)	Other (cents per kilolitre)
<b>Water Consumption Cost</b>	<b>57</b>	<b>57</b>	<b>57</b>	<b>57</b>
Average price paid by consumers	50	100	90	60
Average amount contributed by Government or Council CSO's	10	0	6	10
<b>Total Revenue</b>	<b>60</b>	<b>100</b>	<b>96</b>	<b>70</b>
Difference (Contribution toward fixed costs)	3	43	39	13
<b>Cross subsidy received? (Yes/No)</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: the 'water consumption cost' has been calculated in accordance with Queensland Government guidelines, using the term 'water consumption cost' instead of 'Long Run Marginal Cost' in the Guidelines. These Guidelines require that a cross-subsidy must be declared only if a consumer group is paying less than the water consumption cost, after taking account of any government contributions or Council Community Service Obligations (CSO's).

### Sample 2. Annual Report Cross-Subsidies Statement (Cross-subsidies)

#### Water Cross Subsidies Statement (Simplified)

	Residential (cents per kilolitre)	Commercial (cents per kilolitre)	Industrial (cents per kilolitre)	Other (cents per kilolitre)
<b>Water Consumption Cost</b>	<b>57</b>	<b>57</b>	<b>57</b>	<b>57</b>
Average price paid by consumers	50	100	90	60
Average amount contributed by Government or Council CSO's	0	0	6	0
<b>Total Revenue</b>	<b>50</b>	<b>100</b>	<b>96</b>	<b>60</b>
Difference (Contribution toward fixed costs)	-7	43	39	3
<b>Cross subsidy received? (Yes/No)</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: the 'water consumption cost' has been calculated in accordance with Queensland Government guidelines, using the term 'water consumption cost' instead of 'Long Run Marginal Cost' in the Guidelines. These Guidelines require that a cross-subsidy must be declared only if a consumer group is paying less than the water consumption cost, after taking account of any government contributions or Council Community Service Obligations (CSO's).

**Appendix 1****Table of Present Values for \$1,000,000**

<b>Year</b>	<b>4%</b>	<b>7%</b>	<b>10%</b>
	<b>\$</b>	<b>\$</b>	<b>\$</b>
<b>1</b>	1,000,000	1,000,000	1,000,000
<b>2</b>	961,538	934,579	909,091
<b>3</b>	924,556	873,439	826,446
<b>4</b>	888,996	816,298	751,315
<b>5</b>	854,804	762,895	683,013
<b>6</b>	821,927	712,986	620,921
<b>7</b>	790,315	666,342	564,474
<b>8</b>	759,918	622,750	513,158
<b>9</b>	730,690	582,009	466,507
<b>10</b>	702,587	543,934	424,098
<b>11</b>	675,564	508,349	385,543
<b>12</b>	649,581	475,093	350,494
<b>13</b>	624,597	444,012	318,631
<b>14</b>	600,574	414,964	289,664
<b>15</b>	577,475	387,817	263,331
<b>16</b>	555,265	362,446	239,392
<b>17</b>	533,908	338,735	217,629
<b>18</b>	513,373	316,574	197,845
<b>19</b>	493,628	295,864	179,859
<b>20</b>	474,642	276,508	163,508