Distribution Cost of Supply (DCoS) Model

Methodology and Application

The application of the DCoS Model in the tariff setting process

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1. Introduction

In accordance with the provisions of clause 6.18.2(a) of the National Electricity Rules (Rules), Aurora is required to prepare an Annual Pricing Proposal for submission and approval of the AER.

Clause 6.18.2(b) further requires that the Annual Pricing Proposal must contain certain information regarding the tariffs that are to be applied by Aurora for the relevant regulatory year.

Aurora's Distribution Cost of Supply (DCoS) Model forms and important step in Aurora's tariff setting process for standard control services and this document provides an overview of the processes and methodologies adopted by Aurora within the DCoS Model.

2. Background

Aurora's DCoS Model uses the Annual Revenue Requirement (ARR) as an input and allocates revenue to asset groupings (by geographic region) and then customer groups. The output of the DCoS Model is a 'target revenue' for each customer group. This customer group target revenue is to be recovered via Aurora's network tariffs.

The DCoS Model process includes:

- geographic definition and asset data extraction;
- customer group definition;
- revenue allocation to asset classes and customer groups; and
- an output of revenue by customer group and geographic region.

3. Geographic region definition

Aurora's DCoS Model has been constructed to reflect geographic differences in the cost of the distribution services provided by Aurora. The geographic zones have been spatially defined (in Aurora's geo-spatial environment) allowing repeatable and consistent data extraction. Whilst it is a Rules requirement that uniform tariffs must be developed, an understanding of geographic costs assists in analysing the merits of pricing zones and communication of differential profitability and cross-subsidies.

Aurora's Distribution Business divides Tasmania into 19 regions for operational performance measurement. The areas are defined to represent regions of homogenous operating conditions (similar assets, environment and customer characteristics). The regions are as follows:

- Burnie Urban;
- Devonport Urban;
- East Coast;
- George Town Industrial;
- Highlands;
- Hobart CBD;
- Hobart Urban;
- Launceston CBD;
- Launceston Urban;
- Midlands North;
- Midlands South;
- North Central;
- North Coast;
- North East;
- North West;
- Sorell-Peninsula;
- South;
- Tamar West; and
- West Coast.

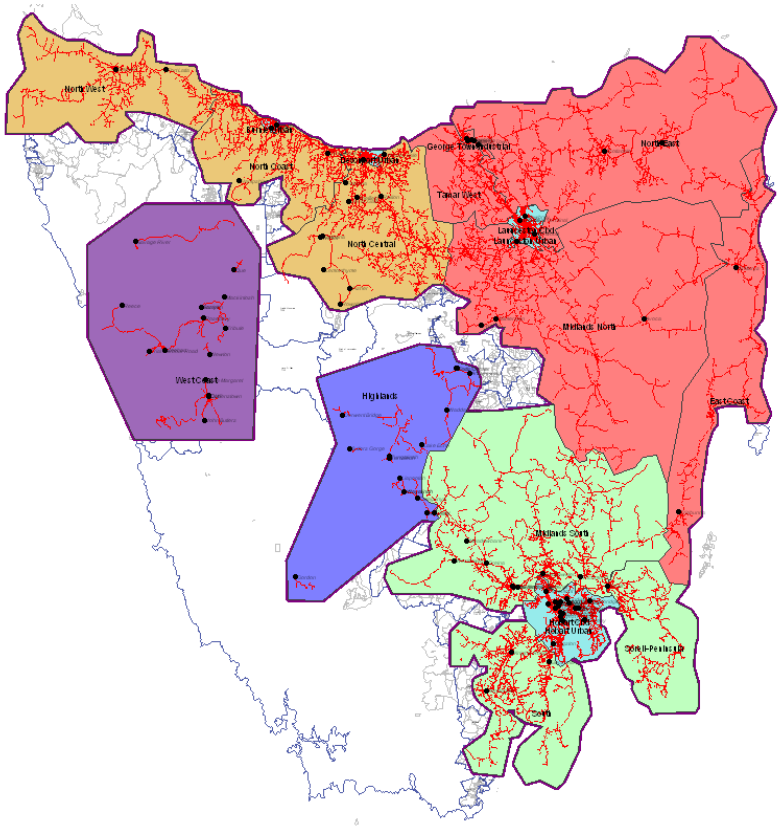
Aurora's DCoS Model utilises six geographic regions, based on the amalgamation of the regions defined for operational performance management. The geographic areas used in the DCoS Model are:

Table 1: DCoS Model regions

DCoS region	Distribution performance management region
Urban/CBD	Burnie Urban, Devonport Urban, Hobart CBD, Hobart Urban, Launceston CBD and Launceston Urban
North West	North Central, North Coast and North West
North	East Coast, George Town Industrial, Midlands North, North East and Tamar West
Highlands	Highlands
South	Midlands South, Sorell-Peninsula and South
West Coast	West Coast

The use of the outlined DCoS regions allows for a one-to-one correlation with operational areas which makes asset data capture manageable, and repeatable.

The map below depicts the DCoS Model geographic regions.



4. Asset group definition

The following asset groups have been used within Aurora's DCoS Model:

- transmission;
- subtransmission;
- zone substation;
- high voltage;
- distribution transformer;
- low voltage;
- common service; and
- connection.

These asset groups have been chosen as they represent the individual components within the distribution network where the driver for expenditure varies and the connection characteristics of the customer also vary. These are expanded below:

- all customers are a beneficiary of the transmission network and should receive a share of the costs associated with the provision of the transmission network;
- all customers are a beneficiary of the subtransmission network and the associated zone substations. They should receive a share of the costs associated with the provision of subtransmission network and zone substations in their geographic region;
- all customers are a beneficiary of the high voltage network and should receive a share of the costs associated with the provision of high voltage network. Customers in rural areas should however receive a larger allocation of these costs as there is limited use of low voltage networks in these regions;
- only low voltage customers are a beneficiary of low voltage assets. All large LV customers are likely to have dedicated (or largely dedicated) transformers, whereas small low voltage and all residential customers will use a large proportion of the shared low voltage network and therefore indirectly the transformers associated with that network;
- all customers are a beneficiary of the common services (buildings, fleet, etc) that are provided by Aurora; and
- all customers have connection assets that are associated with their use of the distribution network.

5. Customer group definition

The following customer groups have been used within Aurora's DCoS Model:

- unmetered;
- streetlighting;
- uncontrolled energy;
- controlled energy;
- residential (light and power);
- LV < 25 kVA;
- LV 25 to 70 kVA;
- LV 70 to 300 kVA;
- LV > 300 kVA;
- HV < 2 MVA; and
- HV > 2 MVA.

The rationale for adopting these customer groups includes:

- low voltage single phase less than 25 kVA customers was chosen because 100 amps reflects the minimum service fuse size, this typically reflects non-process loads;
- low voltage customers between 25 kVA and 70 kVA will most likely fall within the manufacturing/commercial sector and be involved in some form of process usage. The upper boundary of the proposed range was selected because the maximum size for whole current meters is 100 amps. For more than 100 amp three-phase, customers are likely to be supplied via an underground cable which represents a difference in costs associated with supply;
- low voltage customers with maximum demand between 70 kVA and 300 kVA are three-phase customers likely to be connected to the shared low voltage system; and
- low voltage customers with maximum demand in excess of 300 kVA are likely to have dedicated (or largely dedicated) transformers and use a small proportion of the shared LV system.

Embedded generation has been excluded as a customer group in this iteration of the DCoS Model as Aurora currently has no generation customers that necessitate revenue apportionment. The Rules require that generation customers are not charged for the utilisation of the shared distribution network. Aurora's existing embedded generation customers currently have no dedicated connection assets that have not been fully funded by the customer as a component of their connection.

The inclusion of an embedded generation customer group will be considered in the future (where dedicated connection assets are not fully funded) as this would aid in the correct apportionment of associated connection assets which comprise part of Aurora's RAB.

The use of the outlined customer groups does not pose a restriction in terms of network tariff definition and development. A single DCoS customer group may have multiple network tariffs associated or alternatively multiple DCoS customer groups may be covered by a single network tariff.

6. Revenue entitlement grouping definition and allocation process

Aurora's Revenue Cap has been determined by the AER and is based on a building block approach, which includes each of the regulated cost components, namely:

- a return on capital (including the indexation of the regulatory asset base);
- a return of capital (regulatory depreciation);
- an estimated amount of corporate income tax payable;
- any revenue increments or decrements arising from the application of the efficiency benefit sharing scheme, service target performance incentive scheme and demand management incentive scheme;
- any revenue increments or decrements arising from the application of a control mechanism in the previous regulatory control period;
- any revenue increments or decrements arising from an under/over-recovery and/or pass through events; and
- forecast operating expenditure.

Aurora's revenue estimate for its network tariffs also includes an estimation of the charge that will be levied by Transend Networks Pty Ltd (Transend) for the use of the transmission network.

6.1. Allocation to asset classes

The first step of the DCoS process is to allocate or assign the network costs to asset classes in the most efficient and cost reflective way. That is, the DCoS methodology ensures costs are allocated on a causal basis.

6.1.1. Return on capital

The return on capital component of the revenue cap (which represents Aurora's return on its regulated asset base) can be separated into three distinct cost groups on the basis of the asset type. These cost groups are:

- **network –** the return on capital for those system assets employed in the provision of distribution services to customers.
- **common service –** the return on capital for those assets associated with the provision of common services. For example, fleet, IT and buildings.
- **connection services –** the return on capital for connection assets.

Return on capital costs are allocated to each geographic region on the basis in proportion of to the depreciated value of the assets or depreciated optimised replacement cost (DORC).

Further, the return on capital component allocated to the network cost pool is further allocated to the following distribution asset classes:

- subtransmission;
- zone substations;

- high voltage network;
- distribution transformers; and
- low voltage network.

Return on capital costs are allocated to each asset class in proportion to the value of assets (DORC).

6.1.2. Regulatory depreciation

The regulatory depreciation allowance is separated into the same three cost groups as the return on capital allowance. These cost groups are:

- **network –** the regulatory depreciation of those assets employed for the provision of distribution services to customers;
- **common services –** the regulatory depreciation for those assets associated with the provision of common services. For example, fleet, IT and buildings.
- **connection services -** the regulatory depreciation for connection assets.

Regulatory depreciation costs are allocated to each geographic region on the basis in proportion of to the installed value of the assets or optimised replacement cost (ORC).

Further, the regulatory depreciation component allocated to the network cost pool is further allocated to the following distribution asset classes:

- subtransmission;
- zone substations;
- high voltage network;
- distribution transformers; and
- low voltage network.

Regulatory depreciation costs are allocated to each asset class in proportion to the ORC valuation.

6.1.3. Operating expenditure

The AER has determined an overall efficient operating expenditure target for Aurora as part of the regulatory review process. The operating expenditure costs are separated into two distinct cost groups based on the proportion of operating expenditure. These cost groups are:

- **network costs –** those costs directly associated with the operation and maintenance of asset classes that are attributable to particular customer classes.
- **common service –** include overheads and other operating costs which represent the summation of the non-system based costs which include corporate and divisional overheads.

The DCoS Model is used to allocate these network costs to the users of the respective asset class. Costs are allocated to asset classes on the basis of the remaining life of the asset, following which costs are allocated to customer classes. An allocation on the basis of remaining asset life ensures that the oldest assets receive the largest proportion of maintenance costs as maintenance activities increase with asset age.

6.1.4. Tax allowance

The benchmark tax liability as calculated within the AER's Post Tax Revenue Model (PTRM) is allocated to each of the three building block components of operating expenditure, return on capital and regulatory depreciation. The allocation is based on the ratio of their respective allocated revenue amounts. As outlined above, within each of these regulatory cost components there are a number of cost groups. The allocated tax allowance is therefore allocated to each cost group on the basis of their respected share of the total revenue.

6.1.5. Under/over recoveries and pass through events

Any calculated under or over recoveries or costs associated with a pass through event is allocated to each of the three building block components of operating expenditure, return on capital and regulatory depreciation. The allocation is based on the ratio of their respective allocated revenue amounts. As outlined above, within each of these regulatory cost components there are a number of cost groups. The allocated under or over recoveries or a cost associated with a pass through event is therefore allocated to each cost group on the basis of their respected share of the total revenue.

6.1.6. Transmission charges

Transmission charges are fully allocated to an asset class of transmission. Estimated transmission charges are allocated to geographic regions using an extension of Transend's locational pricing methodology.

6.2. Allocation to customer classes

The second step of the DCoS process is to allocate or assign the network costs, already allocated to asset classes, to customer classes in the most efficient and cost reflective way. That is, the DCoS methodology ensures costs are allocated on a causal basis.

There are a range of cost allocators that are used within Aurora's DCoS Model. The selection of the appropriate allocator is based on the ability of the allocator to reflect the fundamental cost driver. Aurora has adopted the allocators outlined below in the DCoS Model for the following reasons:

- **number of customers –** this allocator is deemed appropriate for those costs that are dependent upon or driven by the number of connected customers.
- **anytime maximum demand** (ATMD) **–** this has been used to reflect the long run marginal cost associated with changes in demand.

The uncontrolled and controlled heating group is allocated an estimate of incremental costs as they are only available in conjunction with another type of network tariff. All other customer groups are allocated average costs.

Network costs are related both to the number of customer connections and customers' maximum demands. In general the closer to the customer, the more "per customer" the cost allocation. Consider the transmission network costs, the cost of adding a new residential subdivision is only related to the diversified maximum demand. However, the cost of the 400 V extension required is almost perfectly correlated with the number of new residential customers.

6.2.1. Transmission assets

All customer groups use the transmission network. Costs are typically driven by the demand requirements of the network and are therefore allocated to customer groups on the basis of group ATMD.

6.2.2. Subtransmission assets

All customer groups use the subtransmission network. Costs are typically driven by the demand requirements of the network and are therefore allocated to customer groups on the basis of group ATMD.

6.2.3. Zone substation assets

All customer groups use zone substations. Costs are typically driven by the demand requirements of the network and are therefore allocated to customer groups on the basis of group ATMD.

6.2.4. High voltage assets

All customer groups use the high voltage network. Costs are driven by the demand requirements of the network and the number of customers and are therefore allocated to customer groups on the basis of group ATMD and customer numbers. As there is little use of low voltage networks in rural areas the driver for the high voltage assets in these regions is weighted toward the number of customers as each connecting customer will tend to increase the size of the high voltage network.

High voltage network costs are allocated to urban customer groups 60 percent on ATMD, 40 percent on per customer. Rural customer groups are allocated 20 percent on ATMD and 80 percent on per customer.

6.2.5. Distribution transformer assets

No costs are allocated to high voltage connected customers because these customers do not use Aurora-owned distribution transformers.

No costs are allocated to the LV > 300kVA customer group. These customers generally have a dedicated distribution transformer and these costs are therefore included as connection assets.

Distribution transformer costs are allocated to remaining customer groups 60 percent on demand, 40 percent on per customer.

6.2.6. Low voltage assets

No costs are allocated to high voltage connected customers because these customers do not use the low voltage network.

No costs are allocated to LV > 300kVA group. These customers are connected to the low voltage terminals of a distribution transformer or all the low voltage cabling is included as connection assets.

Low voltage network costs are allocated to remaining customer groups 25 percent on demand, 75 percent on per customer.

6.2.7. Common service assets

All customer groups use common service assets. Costs are allocated to customer groups 50 percent on demand, 50 percent on per customer.

6.2.8. Connection assets

Connection assets are allocated to customer groups on the basis of typical connection configurations.

6.3. Cost allocation summary

Table 2 provides a summary of the DCoS cost category, the cost driver and the allocation adopted in accordance with Aurora's established principles.

Table 2: Allocation of costs to user groups